REMEDIAL INVESTIGATION WORKPLAN

AOC 13 – Former Oil Water Lagoons
AOC 42 – Methanol Truck Unloading Area, Decontamination Area
AOC 87 – Flare Knock Out Drum

Hess Corporation – Former Port Reading Complex (HC-PR)
750 Cliff Road
Port Reading, Middlesex County, New Jersey
NJDEP PI# 006148
ISRA Case No. E20130449
EPA ID No. NJD045445483

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1.0 INTRODUCTION

On behalf of Hess Corporation (Hess), Earth Systems, Inc. (Earth Systems) has prepared this Remedial Investigation Workplan (RIW) for the following environmental Areas of Concern (AOCs) located at the Hess Corporation Former Port Reading Complex (HC-PR), located at 750 Cliff Road, in Port Reading (Woodbridge Township), Middlesex County, New Jersey (the Site):

- AOC 13 – Former Oil Water Lagoons
- AOC 42 – Methanol Truck Unloading Area, Decontamination Area
- AOC 87 – Flare Knock Out Drum

The above AOCs were grouped together due to their proximity to each other. A United States Geological Survey (USGS) 7.5-minute series quadrangle map (Arthur Kill, New Jersey), depicting the HC-PR facility location is presented as **Figure 1** and **Figure 2** presents the Site layout.

Due to historic operations, the Site is jointly regulated by both the New Jersey Department of Environmental Protection (NJDEP) and the United States Environmental Protection Agency (USEPA). The NJDEP Industrial Site Recovery Act (ISRA) was triggered when Hess Corporation executed an agreement to sell the Port Reading Complex to Buckeye Partners (Buckeye) in 2013. The Site is regulated under USEPA's Resource Conservation and Recovery Act (RCRA).

A Preliminary Assessment (PA) Report was submitted to the NJDEP and the USEPA on October 9, 2015. A total of 117 AOCs were identified in the PA (**Figure 4.1** through **4.5**). Earth Systems concluded that, of the total number of AOCs identified at the Site, 62 AOCs required further investigation. A Site Investigation Report (SIR) was submitted to the NJDEP and USEPA on November 7, 2015. The NJDEP provided several comment letters for the SI. The following is a list of the dates of the comment letters and responses. The SI was approved by the NJDEP on August 24, 2021.

NJDEP Comment Letter Date	Response to Comment (RTC) Date
August 10, 2017	December 20, 2017
June 9, 2020	July 31, 2020
December 6, 2018 (Ann Charles NJDEP)	October 19, 2020
December 6, 2018 (Jill Monroe NJDEP)	October 19, 2020
November 17, 2020	February 17, 2021

Any applicable NJDEP/USEPA comments pertaining to this AOC group are either addressed in this RIW or will be included in the final Remedial Investigation Report (RIR) as applicable data is gathered. In addition, an Ecological Receptors Remedial Investigation Report (Ecological RIR), which includes results of contaminant delineation in environmentally sensitive natural resources (ESNRs) and an Ecological Risk Assessment pursuant to N.J.A.C.7:26E-4.8 and in accordance with the Ecological

Evaluation Technical Guidance, will be provided for each AOC grouping where impacts are identified. The Ecological RIRs shall be incorporated into the final Remedial Investigation Reports (RIRs) for each AOC grouping. Data for all media pertaining to the AOC group specified in this RIW will be incorporated into this Ecological RIR, as applicable.

In accordance with the New Jersey Technical Requirements for Site Remediation (TRSR) (7:26E-4.1d), this RIW is being submitted for approval since the Site is regulated under RCRA, in addition to being subject to reporting requirements under ISRA. This RIW is an AOC specific plan solely intended to address investigation of the above referenced AOCs.

In accordance with TRSR 7:26E-4.2, since the current property owner (Buckeye) has agreed to the use of both engineering and institutional controls as part of the final remediation strategy, horizontal and vertical delineation of soil impacts associated with this AOC group is not required to a direct contact standard (Residential or Non-Residential) as long as the following conditions are met:

- Off-site soil impacts will be delineated both horizontally and vertically in both the saturated and unsaturated zones to the residential direct contact soil remediation standards (SRS);
- Soil must be horizontally and vertically delineated to the Migration to Groundwater (MGW) standard in the unsaturated zone both on and off-site;
- Free and residual product will be horizontally and vertically delineated in the saturated and unsaturated zones; and
- A remedial investigation will be conducted for historic fill materials.

Therefore, the intent of the proposed RI activities is to delineate groundwater impacts and free product and/or residual product in the saturated and unsaturated zones pertaining to this AOC group. Soil will be delineated to the MGW standard in both the saturated and unsaturated zone, if applicable. A Sitewide historic fill material investigation will be submitted as a separate report.

As discussed during the 2021 Q3 Quarterly meeting, RI activities for select AOCs would be conducted “At Risk.” “At Risk” work refers to investigation activities that are proposed in a RIW that is submitted to the NJDEP and USEPA for review. If the NJDEP and USEPA confirm that the RIW 90-day review timeframe cannot be met, the proposed investigation activities may be conducted “At Risk.” At the completion of all RI activities (once delineation is complete), a final RIR will be submitted that will document all investigation data and observations. Please note that this RIW is being submitted to the USEPA and NJDEP but will also most likely be conducted “At Risk”.

The following RIW provides a summary of historic soil and groundwater investigation activities for the select AOCs and adjacent AOCs (as applicable). Following the summary, recommendations are provided that outline additional investigation activities required to delineate impacts in order to satisfy NJDEP requirements in accordance with the TRSR, New Jersey Administrative Code (N.J.A.C.) 7:26E; N.J.A.C 7:26C, the

Administrative Requirements for the Remediation of Contaminated Sites (ARRCS); N.J.S.A. 58:10C-1 et seq., the Site Remediation Reform Act (SRRA); and the associated NJDEP SRRA Guidance Documents.

2.0 BACKGROUND

2.1 Site Description and History

The HC-PR facility is an approximate 223-acre irregularly shaped parcel, situated in an industrially developed waterfront area. A USGS map of the facility location is present as **Figure 1**. The HC-PR facility is identified as Block 756, Lot 3; Block 756.01, Lots 1.02, 2, and 3; Block 756.02, Lots 1 and 8; Block 757, Lot 1; Block 760, Lot 6; Block 760.01, Lots 2 and 3; Block 760.02, Lots 1, 2, and 3; Block 1096.01, Lot 6; and Block 664.01, Lots 1.01 and 1.02 (**Figures 2** and **3**).

The HC-PR facility is located east of Cliff Road and abuts the southern property boundary of the Conrail Port Reading Rail yard. Immediately east-southeast of the facility is the Arthur Kill shipping channel, and to the southwest is the PSE&G Sewaren Generating facility. The former Port Reading Coal Docks, currently owned by Prologis Corporation, are located to the northeast. Port Reading Avenue is located to the northwest. A mixture of industrial and commercial properties are located to the west. Residential properties are located up-gradient to the northwest, and an industrial property is located to the south.

The HC-PR facility formerly processed low sulfur gas oils and residuals as feed to a Fluidized Catalytic Cracking Unit (FCCU) that converts gas oil into gasoline, fuel oil, and other hydrocarbon products (e.g. methane, ethane, and liquid petroleum gas). The HC-PR site operations were initiated in 1958 with a Crude Topping Unit and underwent various expansions between 1958 and 1970. In 1974, refining operations were suspended, and the facility operated only as a bulk storage and distribution terminal until 1985. In April 1985, following a retrofit, the HC-PR facility resumed refining operations. The refinery portion of the facility was demolished in 2015, and currently the Site is operated only as a bulk storage and distribution terminal by Buckeye.

AOC 13 - Former Oil Water Lagoons

The Former Oil Water Lagoons area is comprised of three (3) former lagoons: the former Oily Water Lagoon (or Oil/Water Separator Lagoon), the former Mini-Lagoon, and the former Filter Backwash Lagoon. The lagoons were located in the central-southern portion of the site (see **Figure 4.1**). The lagoons were used for waste, oil/water disposal and storm water management.

Former Oily Water Lagoon

The Former Oily Water Lagoon was located in the current location of the South Landfarm. Based on historic reports and historic aerial photographs, this lagoon operated from the 1960s through 1974. The Former Oily Water Lagoon was no longer utilized once the Aeration Basins (AOC 5) were constructed for the treatment of Site stormwater and wastewater.

Mini-Lagoon

Based on historic records and historic aerial photographs, the Mini-Lagoon operated between approximately 1970 through 1984. The Mini-Lagoon was constructed in the former channel of Smith Creek, immediately south of the South Landfarm and adjacent to the northern end of the Detention Basin (see **Figure 4.1**).

Filter Backwash Lagoon

The Filter Backwash Lagoon was located beneath the current location of TK-1911. Based on historic records and historic aerial photographs, the Filter Backwash Lagoon operated from approximately 1974 through 1983.

AOC 42 – Methanol Truck Unloading Area, Decontamination Area

During the PA Site inspection conducted on January 20, 2014, a concrete slab was observed located east of the Rundown Tankfield (AOC-14b) that was used as a decontamination area and a loading area (see **Figure 4.1**). The loading area was identified as the Methanol Truck Unloading Area, which consisted of piping mounted onto a concrete platform with a metal grate surrounding it. Several empty and full 55-gallon drums, 350-gallon and 550-gallon steel totes, and rubberized tanks were observed on the concrete slab, all of which appeared to be in different stages of being cleaned or separated and awaiting transportation for disposal. Two storm water catch basins were observed within the concrete slab area, which were connected to the wastewater treatment plant, and several areas of stained concrete were observed within the decontamination area.

AOC 87 – Flare Knock Out Drum

During the PA site inspection conducted on January 20, 2014, one large tank-like structure, mounted on its side (on concrete supports) was observed southeast of the Rundown Tankfield (AOC-14b) (see **Figure 4.1**). The structure, identified as the Flare Knock Out Drum, had several large pipes attached to it. This drum functioned as a vapor liquid separator. Several pumps and pits with metal grating associated with the Flare Knock Out Drum were observed. Ponded water and slight staining were observed on the gravel in the vicinity of AOC 87.

2.2 Site Topography and Surface Water

Topography of the Site and surrounding area is generally flat with a very gradual slope towards the Arthur Kill. The total difference in topographic relief on the developed portions of the Site is less than 5 feet. Surveyed ground surface elevations indicated that the developed portion of the property, which has an approximate total area of 223 acres, ranges in elevation from 5 to 10 feet above MSL referenced to North American Vertical Datum on 1988 (NAVD88).

A detention basin (AOC 12) is located to the south of the AOCs addressed in this RIW. Stormwater enters the detention basin through overland flow.

2.3 Site Geology and Hydrogeology

The geology of the HC-PR facility was determined from the data collected at the HC-PR facility, during the subsurface investigations, and from the Geologic Map of the State of New Jersey. The HC-PR facility is underlain by the Magothy and Raritan formations, which are the lowest members of the Crestaceous-age Coastal Plain physiographic sediments. The Raritan Formation consists of sands and clays of variable color and grain size, and the overlying Magothy Formation consists of dark lignitic sand and clay containing glauconite near the top. The western section of the HC-PR facility is underlain by a thick clay unit, while marsh deposits underlie the eastern and southeastern section of the HR-PC facility.

The shallow unconfined water table at the HC-PR facility was encountered between approximately 2 and 11 feet below ground surface (bgs). Groundwater flow is predominately southeastern in the northwest portion of the HC-PR facility and east-southeasterly in the central portion of the HC-PR facility. The HC-PR facility wells located adjacent the Arthur Kill and North Drainage Ditch are affected by tidal influences. Wells located further away from the Arthur Kill are generally unaffected by tidal influences. Groundwater contour maps have been included as **Figure 5a** and **Figure 5b.**

Based upon site observations, and a review of the soil boring logs for SLF-SBGRD-12 and SLF-SBGRD-13 (discussed further in **Section 4.0**), the AOC 13 area is underlain by approximately 5-feet of clay and sand, followed by a 2-foot layer of fill material, followed by a silt, sand, clay mix. A grey clay layer is present from approximately 17 to 27 feet below grade. A sand layer was then observed at approximately 28 feet below grade. Meadowmat was encountered in the SLF-SBGRD-13 boring at approximately 12 and 20 feet below grade.

3.0 REGULATORY COMPLIANCE

3.1 Identification of Applicable Standards

The applicable regulatory standards for the Site are the 2021 NJDEP Residential Soil Remediation Standards (RSRS), Non-Residential Soil Remediation Standards (NRSRS), the Migration to Groundwater Exposure Pathway (MGW), and the Groundwater Quality Standards (GWQS). For Extractable Petroleum Hydrocarbon (EPH), the applicable regulatory standard being used is EPH Category-2, which is determined by using the NJDEP EPH Calculator.

3.2 Variance/Deviation

As per the NJDEP Field Sampling Procedures Manual (FSPM), soil samples collected for Volatile Organic Compound (VOC) analysis must be collected from an intact core to minimize potential volatilization of the sample. In accordance with Hess and Buckeye safety protocols, all soil borings must use 'soft digging' techniques from the surface to 6 or 8 feet below grade, depending on the location of the boring in relation to piping runs or tanks. 'Soft digging' techniques include the use of a hand auger and/or an air knife. Therefore, all soil samples collected from the surface to 6.0 (or 8.0) feet below grade will be collected utilizing a hand auger, when possible.

Analytical results obtained from soil samples collected in this interval will be qualified as being potentially biased low in the final RIR for this AOC group. The analytical results will be evaluated in conjunction with multiple lines of evidence in order to gain a full understanding of subsurface conditions to ensure that qualified analytical results are representative of potential VOC soil impacts. The multiple lines of evidence include:

- Direct reading instruments
- Observations of odor and color
- Staining
- Changes in lithology
- Soil properties that affect contaminant migration
- Physical and chemical nature of the contaminant
- Groundwater quality in the area

The Licensed Site Remediation Professional (LSRP) of record for the Site has determined that the soil sample collection technique described above will achieve the objectives of the remedial investigation and result in sufficient usable data to design a remedial strategy.

4.0 HISTORIC SOIL INVESTIGATION ACTIVITIES

The following sections summarize the analytical data and investigation activities conducted in 2009 through 2012 for each of the subject AOCs.

4.1 AOC 13 – Former Oil Water Lagoons

In September 2013, two (2) soil borings (SLF-SBGRD-12 and SLF-SBGRD-13) were advanced to investigate potential soil impacts for AOC 13 – Former Oil Water Lagoons. Three (3) soil samples were collected from each boring and analyzed for VOCs, Base Neutrals (BNs), metals, and extractable petroleum hydrocarbons (EPH). Soil boring logs are included in **Appendix A**.

No targeted VOCs or BNs were detected at concentrations exceeding the RSRS or NRSRS. EPH was detected in soil sample SLF-SBGRD-12 (11.5-12.0 ft) at a concentration of 9,680 parts per million (ppm). Arsenic was detected in excess of the NRSRS (19 ppm) in three (3) soil samples at concentrations of 58.6 ppm, 25.9 ppm, and 22.1 ppm. No other targeted metals were detected exceeding the RSRS or NRSRS.

The soil sample locations are illustrated on **Figure 6** and the analytical data is summarized on **Figure 6** and **Table 1**.

4.2 AOC 42 – Methanol Truck Unloading Area, Decontamination Area

No soil sampling was conducted for AOC 42 during the 2015 SI activities.

4.3 AOC 87 – Flare Knock Out Drum

Two (2) soil borings (FKD-SS-1 and FKD-SS-2) were installed during the September 2015 SI to investigate this AOC. One soil sample was collected from each boring for laboratory analysis. The samples were analyzed for EPH, with contingency analyses conducted on sample FKD-SS-1 for VOCs, BNs, PCBs, and Metals. EPH was not detected in either soil sample exceeding the applicable SRS. No targeted VOCs, BNs, PCBs, or metals were detected at concentrations exceeding the RSRS or NRSRS.

The soil sample locations are illustrated on **Figure 6** and the analytical data is summarized on **Figure 6** and **Table 2**.

5.0 GROUNDWATER INVESTIGATION

5.1 Temporary Monitoring Well Investigation

An extensive groundwater investigation has been conducted to address the AOC 13 area. This included the installation of multiple temporary wells and monitoring wells. The investigation was primarily conducted to address AOC 2 – South Landfarm; however, this data is also applicable to the evaluation of AOC 13 since AOC 2 is currently located within a portion of the former AOC 13 location.

The following sections summarize the temporary well analytical results. The groundwater samples collected from the temporary wells were analyzed for Target Compound List/Target Analyte List plus Tentatively Identified Compounds (TCL/TAL+30) which included VOCs, BNs, and metals. However, only the VOC and BN analytical data is summarized in this RIW since analytical results for metals tend to be biased high in samples collected from temporary wells.

5.1.1 October 2009 Temporary Well Investigation

Twelve (12) temporary wells (SFL-TW-1 through SFL-TW-12) were installed in October 2009 as part of the groundwater investigation of AOC 2 – South Landfarm. These temporary wells were installed to delineate Light Non-Aqueous Phase Liquid (LNAPL) previously detected in on-site permanent monitoring wells. It should be noted that LNAPL was detected in temporary well SLF-TW-2.

The following section summarizes the analytical results.

<u>VOC Analytical Results</u>
Benzene was detected at concentrations ranging from 4.7 parts per billion (ppb) to 172 ppb in the groundwater samples collected from temporary wells SFL-TW-1 through SFL-TW-6 and SLF-TW-8 through SFL-TW-11, exceeding the GWQS of 1 ppb. Dibromochloromethane was detected at a concentration of 468 ppb in the groundwater sample collected from temporary well SLF-TW-3, exceeding the GWQS of 1 ppb. No other targeted VOCs were detected at concentrations exceeding the GWQS in the remaining groundwater samples.

<u>BN Analytical Results</u>
Several BNs were detected in the groundwater samples collected from temporary wells SLF-TW-1, SLF-TW-5, SLF-TW-8, and SLF-TW-10 at concentrations exceeding the GWQS.

The following table summarizes the analytical results.

Client Sample ID:		NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	SLF-TW1	SLF-TW3	SLF-TW4	SLF-TW5	SLF-TW6	SLF-TW7	SLF-TW8	SLF-TW9	SLF-TW10	SLF-TW11	SLF-TW12
Lab Sample ID:			JA31453-1	JA31453-2	JA31453-3	JA31453-4	JA31453-5	JA31453-6	JA31453-7	JA31453-8	JA31453-9	JA31453-10	JA31453-11
Date Sampled:			10/27/2009	10/27/2009	10/27/2009	10/27/2009	10/27/2009	10/27/2009	10/27/2009	10/27/2009	10/27/2009	10/27/2009	10/27/2009
Matrix:			Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
MS Volatiles (SW846 8260B)													
Benzene	ug/l	1	**9.6**	**69.6**	**27.3**	**9**	**4.7**	0.39 J	**172**	**22.4**	**25.6**	**19.8**	ND
MS Semi-volatiles (SW846 8270C)													
Benzo(a)anthracene	ug/l	0.1	**2.8**	ND	ND	**3.2**	ND	ND	ND	ND	**1.1 J**	ND	ND
Benzo(a)pyrene	ug/l	0.1	**1.1**	ND	ND	**1.8**	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/l	0.2	**0.43 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/l	3	1.1 J	ND	ND	**7.1**	ND	ND	ND	ND	1.8 J	ND	ND
2-Methylnaphthalene	ug/l	30	**89.3**	24.9	**32.6**	**61**	11	6.6	**73.9**	19.2	21.4	ND	ND
ND - Non-Detect, J- Estimated Concentration													

The temporary well locations are illustrated on **Figures 7a, 7b, and 7c** and the analytical data is summarized on **Figure 7a** and **Table 3a**.

5.1.2 September 2010 Temporary Well Investigation

Twenty-two (22) temporary wells (SLF-TW-13 through SLF-TW-34) were installed in September 2010 as part of the groundwater investigation of AOC 2 – South Landfarm. These temporary wells were installed to delineate LNAPL previously detected in on-site permanent monitoring wells and the 2009 temporary well investigation. It should be noted that no LNAPL was detected during this investigation.

The following section summarizes the analytical results.

<u>VOC Analytical Results</u>
Several VOCs were detected in the groundwater samples collected from all temporary wells, excluding wells SLF-TW14, SLF-TW24, and SLF-TW30, at concentrations exceeding the GWQS.

<u>BN Analytical Results</u>
Several BNs were detected in the groundwater samples collected from all temporary wells, excluding wells SLF-TW14, SLF-TW20, and SLF-TW24, at concentrations exceeding the GWQS.

The following tables summarizes the analytical results.

Client Sample ID:		NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	SLF-TW13	SLF-TW14	SLF-TW15	SLF-TW16	SLF-TW17	SLF-TW18
Lab Sample ID:			JA56385-1	JA56385-2	JA56385-3	JA56385-4	JA56385-5	JA56385-6
Date Sampled:			9/15/2010	9/15/2010	9/15/2010	9/15/2010	9/15/2010	9/15/2010
Matrix:			Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
MS Volatiles (SW846 8260B)								
Benzene	ug/l	1	**4.9**	ND	**97**	**153**	**4.7**	**20.2**
cis-1,2-Dichloroethene	ug/l	70	ND	ND	ND	ND	ND	ND
Tert Butyl Alcohol	ug/l	100	18.7 J	ND	25.4	**318**	ND	17.6 J
Tetrachloroethene	ug/l	1	ND	ND	ND	ND	ND	ND
Trichloroethene	ug/l	1	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/l	1	ND	ND	ND	ND	ND	ND
MS Semi-volatiles (SW846 8270C)								
bis(2-Ethylhexyl)phthalate	ug/l	3	ND	1.2 J	ND	ND	ND	ND
2-Methylnaphthalene	ug/l	30	**30.8**	5.5	**122**	**33.9**	24.6	**42.7**
Naphthalene	ug/l	300	31	-	73.7	6.6	23.7	45.3
Benzo(a)anthracene	ug/l	0.1	ND	ND	**2.82**	ND	**0.199**	**0.134**
Benzo(a)pyrene	ug/l	0.1	ND	ND	**1.94**	ND	ND	ND
Benzo(b)fluoranthene	ug/l	0.2	ND	ND	**1.07**	ND	ND	ND
Benzo(k)fluoranthene	ug/l	0.5	ND	ND	0.475	ND	ND	ND
Chrysene	ug/l	5	ND	ND	4.61	ND	0.317	0.22
Dibenzo(a,h)anthracene	ug/l	0.3	ND	ND	**0.416**	ND	ND	ND
Indeno(1,2,3-cd)pyrene	ug/l	0.2	ND	ND	**0.258**	ND	ND	ND
ND - Non-Detect, J - Estimated Concentration								

Client Sample ID:		NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	SLF-TW19	SLF-TW20	SLF-TW21	SLF-TW22	SLF-TW-23	SLF-TW-24
Lab Sample ID:			JA56385-7	JA56385-8	JA56385-9	JA56385-10	JA56462-8	JA56462-1
Date Sampled:			9/15/2010	9/15/2010	9/15/2010	9/15/2010	9/16/2010	9/16/2010
Matrix:			Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
MS Volatiles (SW846 8260B)								
Benzene	ug/l	1	**103**	**9.5**	**9.4**	**314**	**18.1**	ND
cis-1,2-Dichloroethene	ug/l	70	ND	ND	ND	ND	10.3	ND
Tert Butyl Alcohol	ug/l	100	ND	ND	**926**	**393**	**388**	ND
Tetrachloroethene	ug/l	1	ND	ND	ND	ND	**11.9**	ND
Trichloroethene	ug/l	1	ND	ND	ND	ND	**9.5**	ND
Vinyl chloride	ug/l	1	ND	ND	ND	ND	**4.2**	ND
MS Semi-volatiles (SW846 8270C)								
bis(2-Ethylhexyl)phthalate	ug/l	3	1.8 J	ND	**11.3**	ND	1.4 J	ND
2-Methylnaphthalene	ug/l	30	**614**	1	**725**	**43.9**	23.7	1.7
Naphthalene	ug/l	300	286	12.5	219	231	66.6	-
Benzo(a)anthracene	ug/l	0.1	**2.19**	ND	**2.9**	**0.704**	**0.316**	ND
Benzo(a)pyrene	ug/l	0.1	**2.16**	ND	**2.33**	**0.41**	ND	ND
Benzo(b)fluoranthene	ug/l	0.2	**0.958**	ND	**1.99**	**0.251**	ND	ND
Benzo(k)fluoranthene	ug/l	0.5	**1.53**	ND	**1.16**	0.0936 J	ND	ND
Chrysene	ug/l	5	2.74	ND	4.71	0.781	0.58	ND
Dibenzo(a,h)anthracene	ug/l	0.3	**0.44**	ND	**0.72**	ND	ND	ND
Indeno(1,2,3-cd)pyrene	ug/l	0.2	**0.335**	ND	**0.422**	ND	ND	ND
ND - Non-Detect, J - Estimated Concentration								

Client Sample ID:		NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	SLF-TW-25	SLF-TW-26	SLF-TW-27	SLF-TW-28	SLF-TW-29	SLF-TW-30
Lab Sample ID:			JA56462-2	JA56462-3	JA56462-4	JA56462-5	JA56462-6	JA56462-7
Date Sampled:			9/16/2010	9/16/2010	9/16/2010	9/16/2010	9/16/2010	9/16/2010
Matrix:			Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
MS Volatiles (SW846 8260B)								
Benzene	ug/l	1	**36.6**	**3.6 J**	**7.7**	**64**	**15.5**	0.38 J
cis-1,2-Dichloroethene	ug/l	70	ND	ND	ND	ND	ND	ND
Tert Butyl Alcohol	ug/l	100	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ug/l	1	ND	ND	ND	ND	ND	ND
Trichloroethene	ug/l	1	ND	ND	ND	ND	**5.0 J**	ND
Vinyl chloride	ug/l	1	ND	ND	ND	ND	ND	ND
MS Semi-volatiles (SW846 8270C)								
bis(2-Ethylhexyl)phthalate	ug/l	3	ND	ND	ND	ND	**3.1**	**12.0 J**
2-Methylnaphthalene	ug/l	30	**74.7**	4.9	19	**959**	28.5	ND
Naphthalene	ug/l	300	148	6.3	49.1	**433**	24.1	-
Benzo(a)anthracene	ug/l	0.1	**2.27**	**0.334**	**0.953**	**0.304**	**0.755**	ND
Benzo(a)pyrene	ug/l	0.1	**1.22**	ND	**0.329**	**0.169**	**0.424**	ND
Benzo(b)fluoranthene	ug/l	0.2	**0.7**	ND	ND	0.15	**0.78**	ND
Benzo(k)fluoranthene	ug/l	0.5	0.116	ND	ND	0.0728 J	0.221	ND
Chrysene	ug/l	5	3.51	0.368	1.09	0.442	1.13	ND
Dibenzo(a,h)anthracene	ug/l	0.3	0.169	ND	ND	ND	0.108	ND
Indeno(1,2,3-cd)pyrene	ug/l	0.2	0.14	ND	ND	ND	**0.228**	ND
ND - Non-Detect, J - Estimated Concentration								

Client Sample ID:		NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	SLF-TW-31	SLF-TW-32	SLF-TW33	SLF-TW34
Lab Sample ID:			JA56462-9	JA56462-10	JA56620-1	JA56620-2
Date Sampled:			9/16/2010	9/16/2010	9/17/2010	9/17/2010
Matrix:			Ground Water	Ground Water	Ground Water	Ground Water
MS Volatiles (SW846 8260B)						
Benzene	ug/l	1	**345**	**3.5**	**3.6**	**28.2**
cis-1,2-Dichloroethene	ug/l	70	**894**	0.51 J	ND	ND
Tert Butyl Alcohol	ug/l	100	**1180**	**494**	ND	ND
Tetrachloroethene	ug/l	1	ND	ND	ND	ND
Trichloroethene	ug/l	1	ND	ND	ND	ND
Vinyl chloride	ug/l	1	**279**	ND	ND	ND
MS Semi-volatiles (SW846 8270C)						
bis(2-Ethylhexyl)phthalate	ug/l	3	**23.6**	**4.3**	**3.3**	1.3 J
2-Methylnaphthalene	ug/l	30	**241**	**200**	**193**	**197**
Naphthalene	ug/l	300	83.8	-	17.6	6.1
Benzo(a)anthracene	ug/l	0.1	**4.07**	**1.42**	**0.339**	ND
Benzo(a)pyrene	ug/l	0.1	**3.54**	**0.593**	ND	ND
Benzo(b)fluoranthene	ug/l	0.2	**3.56**	**0.539**	ND	ND
Benzo(k)fluoranthene	ug/l	0.5	**2.32**	0.388	ND	ND
Chrysene	ug/l	5	**9.3**	2.93	0.182	ND
Dibenzo(a,h)anthracene	ug/l	0.3	**0.55**	0.133	ND	ND
Indeno(1,2,3-cd)pyrene	ug/l	0.2	**1.31**	**0.251**	ND	ND
ND - Non-Detect, J - Estimated Concentration						

The temporary well locations are illustrated on **Figures 7a, 7b, and 7c** and the analytical data is summarized on **Figures 7b and 7c** and **Table 3b**.

5.2 Monitoring Well Investigation (South Landfarm Wells)

Four (4) groundwater monitoring wells are located within the AOC 13 area. The monitoring wells were installed as part of ongoing groundwater monitoring requirements for AOC 3 – South Landfarm. Groundwater samples are collected on a quarterly basis from the South Landfarm monitoring wells and analyzed for VOCs, metals, and general chemistry parameters.

The following table summarizes the construction details of these monitoring wells.

Monitoring Well ID	Date Installed	Total Depth (from TOC)	Screened Interval
LS-1R	June 1991	16’	6-16’
LS-2	April 1985	12.25’	7.25-12.25’
LS-3	April 1985	12.5’	6.5-12.5’
LS-4	April 1985	14’	7-14’

A link to the “Well Manual” is included with this submittal and contains monitoring well documentation for all Site wells (permits, records, Form A’s, Form B’s, and logs). The Well Manual is a stand-alone document that will be updated in real time as new wells or data are gathered and the updated Well Manual will be subsequently submitted to the NJDEP and USEPA.

The following section summarizes annual groundwater sampling results from July 2020 through April 2022.

Groundwater samples were collected via low-flow sampling methodology in accordance with the NJDEP's FSPM. Samples were collected in laboratory supplied glassware and transferred to SGS-Accutest Laboratories (SGS) of Dayton, New Jersey (NJ NELAP Certification No. 12129) under strict chain of custody procedures. Groundwater sampling documentation has been submitted with previous Semi-Annual Reports.

Summary of Groundwater Analytical Results

VOCs Analytical Results

Benzene has been detected in the groundwater samples collected from monitoring wells LS-3 and LS-4 at concentrations exceeding the GWQS of 1 ppb. TBA has also been detected in the groundwater samples collected from monitoring well LS-3 at concentrations exceeding the GWQS of 100 ppb.

The following table summarizes the groundwater analytical results.

Compound		Benzene	Tert Butyl Alcohol
Units		ppb	ppb
GWQS		**1**	**100**
LS-1R	**7/16/2020**	ND (0.43)	ND (5.8)
LS-2	**7/16/2020**	0.52	ND (5.8)
LS-3	**7/16/2020**	**10**	**977**
LS-4	**7/16/2020**	**5.3**	32.5
LS-1R	**10/8/2020**	ND (0.43)	ND (5.8)
LS-2	**10/8/2020**	ND (0.43)	6.1 J
LS-3	**10/8/2020**	**3.9**	**1070**
LS-4	**10/8/2020**	**3.5**	82.9
LS-1R	**1/29/2021**	ND (0.43)	ND (5.8)
LS-2	**1/29/2021**	ND (0.43)	ND (5.8)
LS-3	**1/29/2021**	**56**	**543**
LS-4	**1/29/2021**	0.77	21.5
LS-1R	**4/15/2021**	ND (0.43)	ND (5.8)
LS-2	**4/15/2021**	ND (0.43)	ND (5.8)
LS-3	**4/15/2021**	**41.2**	**504**
LS-4	**4/15/2021**	**1.7**	21.8
LS-1R	**7/15/2021**	ND (0.43)	ND (5.8)
LS-2	**7/15/2021**	ND (0.43)	ND (5.8)
LS-3	**7/15/2021**	**7**	**1330**
LS-4	**7/15/2021**	**7.9**	61.9
LS-1R	**10/15/2021**	ND (0.43)	ND (5.8)
LS-2	**10/15/2021**	ND (0.43)	ND (5.8)
LS-3	**10/15/2021**	**1.1**	**1420**
LS-4	**10/15/2021**	**5.1**	94.2
LS-1R	**1/28/2022**	ND (0.43)	ND (5.8)
LS-2	**1/28/2022**	ND (0.43)	ND (5.8)
LS-3	**1/28/2022**	**78.6**	**420**
LS-4	**1/28/2022**	**2.4**	18.9
LS-1R	**4/21/2022**	ND (0.43)	ND (5.8)
LS-2	**4/21/2022**	ND (0.43)	ND (5.8)
LS-3	**4/21/2022**	**55.5**	**489**
LS-4	**4/21/2022**	**8.1**	43.7
ND - Non-Detect, ppb - parts per billion			

Metals/General Chemistry Analytical Results

Several metals were detected at concentrations exceeding the GWQS in groundwater samples collected from all of the AOC 3 – South Landfarm wells. General chemistry parameters were detected at concentrations exceeding the GWQS in groundwater samples collected from wells LS-2, LS-3, and LS-4.

The following table summarizes the groundwater analytical results.

Compound		Arsenic	Iron	Manganese	Sodium	Chloride	Nitrogen, Ammonia	Solids, Total Dissolved
Units		ppb	ppb	ppb	ppb	ppm	ppm	ppm
GWQS		3	300	50	50000	250	3	500
LS-1R	7/16/2020	19.4	NA	NA	NA	77.5	1.8	390
LS-2	7/16/2020	59.7	NA	NA	NA	283	1.7	778
LS-3	7/16/2020	12.6	NA	NA	NA	3130	11.6	6490
LS-4	7/16/2020	29.2	NA	NA	NA	434	24.2	882
LS-1R	10/8/2020	11.9	11400	2710	82500	83.8	1.4	250
LS-2	10/8/2020	43.6	2580	172	174000	368	1.8	953
LS-3	10/8/2020	12.7	84000	1390	1660000	3340	9.5	4630
LS-4	10/8/2020	24.2	6740	154	376000	514	25.1	1080
LS-1R	1/29/2021	9.5	10500	2300	73200	79.9	NA	155
LS-2	1/29/2021	29	3560	171	30500	39.3	NA	20
LS-3	1/29/2021	7.1	26800	1040	999000	<200	NA	2580
LS-4	1/29/2021	14.3	5230	178	416000	731	NA	870
LS-1R	4/15/2021	7.5	8430	3270	82200	72.9	1.7	260
LS-2	4/15/2021	37.6	4590	214	23900	26.3	0.41	140
LS-3	4/15/2021	7.4	46700	940	909000	1800	6.4	3240
LS-4	4/15/2021	14.8	5600	205	380000	655	27.8	1180
LS-1R	7/15/2021	10.5	7640	581	58900	34.1	0.94	127
LS-2	7/15/2021	43.9	3630	301	102000	198	1.4	555
LS-3	7/15/2021	11.7	119000	1960	1440000	3080	10.5	5810
LS-4	7/15/2021	24	12300	246	368000	555	33.6	1080
LS-1R	10/15/2021	8.1	9180	1290	70800	52.4	0.92	240
LS-2	10/15/2021	26.4	1890	180	107000	211	1.5	497
LS-3	10/15/2021	4.3	45200	1320	1320000	3270	10	4740
LS-4	10/15/2021	22	9950	261	423000	764	34.8	1100
LS-1R	1/28/2022	8.6	9320	2360	68000	71.5	1.5	16
LS-2	1/28/2022	28.7	3310	161	31300	44.1	0.68	240
LS-3	1/28/2022	9.5	31900	619	639000	1100	4.5	1280
LS-4	1/28/2022	20.8	10700	248	562000	965	41.1	1390
LS-1R	4/21/2022	13.8	18300	3810	77000	87.7	2.1	348
LS-2	4/21/2022	51.5	7640	244	37900	67.8	1.1	323
LS-3	4/21/2022	10.2	42300	634	772000	1430	7.3	2540
LS-4	4/21/2022	28.9	16900	301	566000	813	45.6	1650
ND - Non-Detect, NA - Not Analyzed, ppb - parts per billion, ppm - parts per million								

Analytical results are summarized on **Figures 8a** and **8b** and **Table 4a, 4b, and 4c**.

5.3 Monitoring Well Investigation (Adjacent AOCs)

Several AOCs are located adjacent to the AOC 13 area. These AOCs are:

- AOC 5 – Aeration Basins (6 monitoring wells)
- AOC 12 – Detention Basin & Smith Creek (10 monitoring wells)
- SRMU – Southern Remediation Management Unit (10 monitoring wells)
- 14 Off-Site Monitoring Wells

Groundwater samples are collected on an annual basis for the above specified wells and analyzed for VOCs, Semi-Volatile Organic Compounds (SVOCs), metals, and general chemistry parameters.

A link to the "Well Manual" is included with this submittal and contains monitoring well documentation for all Site wells (permits, records, Form A's, Form B's, and logs). The Well Manual is a stand-alone document that will be updated in real time as new wells or data are gathered and the updated Well Manual will be subsequently submitted to the NJDEP and USEPA.

The following section summarizes annual groundwater sampling results for December 2021 for the above specified AOCs.

Groundwater samples were collected via low-flow sampling methodology in accordance with the NJDEP's FSPM. Samples were collected in laboratory supplied glassware and transferred to SGS-Accutest Laboratories (SGS) of Dayton, New Jersey (NJ NELAP Certification No. 12129) under strict chain of custody procedures. Groundwater sampling documentation has been submitted with the 2021 Fourth Quarter Report.

Summary of Groundwater Analytical Results

5.3.1 Annual Sampling Summary – AOC 5 – Aeration Basins

In December 2021, groundwater samples were collected from monitoring wells AB-1, AB-3, AB-4R, AB-4D, AB-5, and AB-6, and analyzed for VOCs, SVOCs, metals, and general chemistry parameters. Groundwater samples were collected at shallow and intermediate intervals. Analytical results from the December 2021 AOC 5 – Aeration Basins groundwater sampling event are summarized in **Table 5** and on **Figure 9**.

Benzene was detected in the groundwater samples collected from monitoring wells AB-3 and AB-6 at concentrations exceeding the GWQS. 1,4-Dioxane was detected in the groundwater samples collected from monitoring wells AB-4D and AB-5 at concentrations exceeding the GWQS. Ammonia was detected in the groundwater samples collected from the monitoring wells AB-3, AB-4R, and AB-4D at concentrations exceeding the GWQS.

Select metals were detected at concentrations exceeding the GWQS in groundwater samples collected from all monitoring wells. The following table summarizes the analytical results.

Client Sample ID:	NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	AB-1			AB-3			AB-4R			AB-4D			AB-5			AB-6		
Lab Sample ID:		L2166200-12			L2166200-09			L2166200-07			L2166200-06			L2166200-08			L2168151-04		
Date Sampled:		12/2/2021			12/2/2021			12/2/2021			12/2/2021			12/2/2021			12/10/2021		
Matrix:		WATER			WATER			WATER			WATER			WATER			WATER		
ANALYTE	(ug/l)	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
VOLATILE ORGANICS BY GC/MS																			
Benzene	1	ND		0.08	**3.4**		**0.08**	ND		0.08	ND		0.08	ND		0.08	**2.2**		**0.08**
SEMIVOLATILE ORGANICS BY GC/MS-SIM																			
1,4-Dioxane	0.4	ND		0.0314	0.231		0.0314	0.24		0.0303	**14.1**		**0.0471**	**2.63**		**0.0339**	ND		0.0314
TOTAL METALS																			
Aluminum, Total	200	**391**		**3.27**	**228**		**3.27**	55		3.27	12		3.27	48.3		3.27	**382**		**3.27**
Arsenic, Total	3	**6.837**		**0.165**	1.069		0.165	1.353		0.165	0.9168		0.165	1.397		0.165	1.313		0.165
Iron, Total	300	**2810**		**19.1**	**664**		**19.1**	**6780**		**19.1**	27.1	J	19.1	**3390**		**19.1**	**1720**		**19.1**
Lead, Total	5	1.213		0.343	0.519	J	0.343	ND		0.343	ND		0.343	0.7673	J	0.343	**5.134**		**0.343**
Manganese, Total	50	**68.44**		**0.44**	19.1		0.44	**106.5**		**0.44**	3.043		0.44	**69.56**		**0.44**	35.24		0.44
Sodium, Total	50000	37400		29.3	**832000**		**293**	**1220000**		**1460**	**4850000**		**1460**	5200		29.3	**123000**		**29.3**
GENERAL CHEMISTRY																			
Nitrogen, Ammonia	3000	148		24	**4550**		**48**	**13300**		**24**	**12000**		**24**	396		24	68.6	J	24

J – estimated concentration, ND – non-detect

5.3.2 Annual Sampling Summary – Off-Site Wells

In December 2021, groundwater samples were collected from off-site monitoring wells SC-1, SC-1D, SC-1DD, SC-2, SC-2D, SC-2DD, SC-2DDD, SC-3, SC-3D, SC-3DD, SC-3DDD, SC-4, SC-4D, and SC-4DD, and analyzed for VOCs, SVOCs, metals, and general chemistry parameters. Groundwater samples were collected from shallow, intermediate, and deep groundwater monitoring wells. Analytical results from the December 2021 AOC 10 – Truck Loading Rack groundwater sampling event are summarized in **Table 6** and on **Figure 10**.

Analytical results identified the presence of targeted VOCs and SVOCs at concentrations exceeding their respective GWQS in groundwater samples collected from several shallow, intermediate, and deep monitoring wells. Targeted metals were identified exceeding the GWQS in all groundwater samples. Ammonia was detected at concentrations exceeding the GWQS in groundwater samples collected from several monitoring wells. The following tables summarize the analytical results.

Client Sample ID:	NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	SC-1			SC-2			SC-3			SC-4		
Lab Sample ID:		L2166830-01			L2166830-07			L2166830-11			L2166830-08		
Date Sampled:		12/6/2021			12/6/2021			12/6/2021			12/6/2021		
Matrix:		WATER			WATER			WATER			WATER		
ANALYTE	(ug/l)	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
VOLATILE ORGANICS BY GC/MS													
Benzene	1	**2.3**		**0.08**	**12**		**0.08**	ND		0.08	ND		0.08
Methyl tert butyl ether	70	ND		0.17	ND		0.17	ND		0.17	0.29	J	0.17
Tert-Butyl Alcohol	100	13		1.4	3.7	J	1.4	1.7	J	1.4	ND		1.4
SEMIVOLATILE ORGANICS BY GC/MS-SIM													
Hexachlorobenzene	0.02	ND		0.01	ND		0.01	ND		0.01	ND		0.01
1,4-Dioxane	0.4	**0.442**		**0.0303**	0.0965	J	0.0303	ND		0.0314	0.16		0.0339
TOTAL METALS													
Aluminum, Total	200	71.9	J	32.7	102		3.27	5.34	J	3.27	179		3.27
Arsenic, Total	3	**6.7**		**1.65**	**5.58**		**0.165**	1.09		0.165	0.8239		0.165
Beryllium, Total	1	ND		1.07	ND		0.107	ND		0.107	ND		0.107
Iron, Total	300	**137000**		**191**	**109000**		**19.1**	**22200**		**19.1**	**12500**		**19.1**
Lead, Total	5	ND		3.43	ND		0.343	ND		0.343	1.675		0.343
Manganese, Total	50	**8568**		**4.4**	**768.7**		**0.44**	**2046**		**0.44**	**204.1**		**0.44**
Sodium, Total	50000	**2610000**		**293**	**1330000**		**293**	**1000000**		**293**	**329000**		**29.3**
GENERAL CHEMISTRY													
Nitrogen, Ammonia	3000	**27700**		**240**	**14100**		**48**	**3980**		**24**	2930		24

Client Sample ID:	NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	SC-1D			SC-1DD			SC-2D			SC-2DD			SC-2DDD		
Lab Sample ID:		L2166830-04			L2166830-02			L2166830-03			L2166830-05			L2166830-06		
Date Sampled:		12/6/2021			12/6/2021			12/6/2021			12/6/2021			12/6/2021		
Matrix:		WATER			WATER			WATER			WATER			WATER		
ANALYTE	(ug/l)	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
VOLATILE ORGANICS BY GC/MS																
Benzene	1	ND		0.08	ND		0.08	ND		0.08	ND		0.08	ND		0.08
Methyl tert butyl ether	70	1.2		0.17	0.69	J	0.17	1.4		0.17	ND		0.17	ND		0.17
Tert-Butyl Alcohol	100	ND		1.4	ND		1.4	ND		1.4	ND		1.4	ND		1.4
SEMIVOLATILE ORGANICS BY GC/MS-SIM																
1,4-Dioxane	0.4	**0.623**		**0.0303**	**0.59**		**0.0314**	**0.788**		**0.0314**	ND		0.0303	ND		0.0303
TOTAL METALS																
Aluminum, Total	200	**409**		**3.27**	**501**		**3.27**	**870**		**3.27**	**1580**		**3.27**	141		3.27
Arsenic, Total	3	1.129		0.165	0.3704	J	0.165	1.535		0.165	1.996		0.165	0.4041	J	0.165
Beryllium, Total	1	0.137	J	0.107	0.1506	J	0.107	ND		0.107	0.1931	J	0.107	0.6155		0.107
Iron, Total	300	**1770**		**19.1**	**5240**		**19.1**	**2200**		**19.1**	**16000**		**19.1**	**43900**		**19.1**
Lead, Total	5	1.542		0.343	1.016		0.343	2.013		0.343	**28.28**		**0.343**	0.423	J	0.343
Manganese, Total	50	38.9		0.44	**105.7**		**0.44**	**78.92**		**0.44**	**442**		**0.44**	**990**		**0.44**
Sodium, Total	50000	**86400**		**29.3**	43300		29.3	**865000**		**293**	**182000**		**29.3**	**97100**		**29.3**
GENERAL CHEMISTRY																
Nitrogen, Ammonia	3000	1000		48	107	J	48	**3010**		**48**	322	J	120	128	J	48

Client Sample ID:	SC-3D			SC-3DD			SC-3DDD			SC-4D			SC-4DD		
Lab Sample ID:	L2166830-09			L2166830-10			L2167075-04			L2167075-02			L2167075-03		
Date Sampled:	12/6/2021			12/6/2021			12/7/2021			12/7/2021			12/7/2021		
Matrix:	WATER			WATER			WATER			WATER			WATER		
ANALYTE	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
VOLATILE ORGANICS BY GC/MS															
Benzene	ND		0.08	ND		0.08	ND		0.08	ND		0.08	ND		0.08
Methyl tert butyl ether	**120**		**0.17**	2.4		0.17	ND		0.17	0.48	J	0.17	8.9		0.17
Tert-Butyl Alcohol	**270**		**1.4**	5.7	J	1.4	6.9	J	1.4	88		1.4	**140**		**1.4**
SEMIVOLATILE ORGANICS BY GC/MS-SIM															
1,4-Dioxane	**3.06**		**0.0326**	0.15		0.0326	ND		0.0314	**37.1**		**0.0314**	**35.2**		**0.0339**
TOTAL METALS															
Aluminum, Total	7.64	J	3.27	ND		16.4	18.9	J	16.4	**296**		**3.27**	81.4		3.27
Arsenic, Total	2.324		0.165	ND		0.825	2.666		0.825	**4.976**		**0.165**	**3.875**		**0.165**
Beryllium, Total	ND		0.107	**1.219**	**J**	**0.535**	**3.408**		**0.535**	ND		0.107	ND		0.107
Iron, Total	**2760**		**19.1**	**733000**		**95.5**	**961000**		**95.5**	**1640**		**19.1**	**4700**		**19.1**
Lead, Total	ND		0.343	ND		1.715	ND		1.715	0.8191	J	0.343	0.3543	J	0.343
Manganese, Total	**111**		**0.44**	**16230**		**2.2**	**20940**		**2.2**	**76.83**		**0.44**	**194.8**		**0.44**
Sodium, Total	**742000**		**293**	**2490000**		**146**	**2050000**		**146**	**853000**		**293**	**1140000**		**293**
GENERAL CHEMISTRY															
Nitrogen, Ammonia	**4540**		**24**	656		24	461		24	**3090**		**48**	**5820**		**24**

J – estimated concentration, ND – non-detect

5.3.3 Annual Sampling Summary – AOC 12 – Detention Basin & Smith Creek

In December 2021, groundwater samples were collected from monitoring wells SM-1, PER-2, PER-2D, PER-2DD, PER-3, PER-3D, PER-9, PER-9D, PER-9DD, PER-10, and PER-10D, and analyzed for VOCs, SVOCs, metals, and general chemistry parameters. Groundwater samples were collected from shallow, intermediate, and deep groundwater monitoring wells. Analytical results from the December 2021 AOC 12 – Detention Basin and Smith Creek groundwater sampling event are summarized in **Table 7** and on **Figure 11**.

Analytical results identified the presence of targeted VOCs, SVOCs, and metals at concentrations exceeding their respective GWQS in groundwater samples collected from several shallow, intermediate, and deep monitoring wells. Targeted VOCs and SVOCs were not detected above the GWQS in the groundwater samples collected from monitoring wells PER-2, PER-3, PER-9, PER-10, and PER-9DD. Targeted metals were detected above the GWQS in all groundwater samples. Ammonia was detected above the GWQS in groundwater samples collected from several wells. The following tables summarize the analytical results.

Shallow Groundwater Analytical Results

Client Sample ID:	NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	SM-1			PER-2			PER-3			PER-9			PER-10		
Lab Sample ID:		L2168383-04			L2166615-07			L2167782-04			L2168151-03			L2166200-10		
Date Sampled:		12/13/2021			12/3/2021			12/9/2021			12/10/2021			12/2/2021		
Matrix:		WATER			WATER			WATER			WATER			WATER		
ANALYTE	(ug/l)	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
VOLATILE ORGANICS BY GC/MS																
Methyl tert butyl ether	70	0.48	J	0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17
Tert-Butyl Alcohol	100	12		1.4	ND		1.4	8.3	J	1.4	5.3	J	1.4	2.1	J	1.4
SEMIVOLATILE ORGANICS BY GC/MS																
Bis(2-ethylhexyl)phthalate	3	**5**		**1.5**	ND		1.5	2.1	J	1.5	1.5	J	1.5	ND		1.5
SEMIVOLATILE ORGANICS BY GC/MS-SIM																
Benzo(a)anthracene	0.1	**0.11**		**0.02**	ND		0.02	ND		0.02	0.04	J	0.02	0.04	J	0.02
Benzo(a)pyrene	0.1	**0.12**		**0.02**	ND		0.02	ND		0.02	ND		0.02	ND		0.02
Benzo(b)fluoranthene	0.2	**0.31**		**0.01**	ND		0.01	ND		0.01	0.02	J	0.01	0.02	J	0.01
1,4-Dioxane	0.4	ND		0.0326	ND		0.0314	0.104	J	0.0326	ND		0.0326	ND		0.0314
TOTAL METALS																
Aluminum, Total	200	**2230**		**3.27**	103		3.27	46.5		3.27	147		3.27	24		3.27
Arsenic, Total	3	**9.05**		**0.165**	0.5774		0.165	1.732		0.165	1.026		0.165	0.6336		0.165
Beryllium, Total	1	0.116	J	0.107	ND		0.107	ND		0.107	ND		0.107	ND		0.107
Iron, Total	300	**12000**		**19.1**	**6030**		**19.1**	**10000**		**19.1**	**2120**		**19.1**	**719**		**19.1**
Lead, Total	5	**13.48**		**0.343**	0.5798	J	0.343	0.409	J	0.343	0.3521	J	0.343	ND		0.343
Manganese, Total	50	**252.8**		**0.44**	**810.4**		**0.44**	**1381**		**0.44**	**194**		**0.44**	**190.7**		**0.44**
Sodium, Total	50000	**101000**		**29.3**	9300		29.3	**509000**		**293**	**59900**		**29.3**	41200		29.3
GENERAL CHEMISTRY																
Nitrogen, Ammonia	3000	878		120	593		24	**3280**		**24**	377		24	374		24

Intermediate and Deep Groundwater Analytical Results

Client Sample ID:	NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	PER-2D			PER-2DD			PER-3D			PER-9D			PER-9DD			PER-10D		
Lab Sample ID:		L2166615-06			L2166615-05			L2167782-03			L2168151-02			L2168151-01			L2166200-11		
Date Sampled:		12/3/2021			12/3/2021			12/9/2021			12/10/2021			12/10/2021			12/2/2021		
Matrix:		WATER			WATER			WATER			WATER			WATER			WATER		
ANALYTE	(ug/l)	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
VOLATILE ORGANICS BY GC/MS																			
Methyl tert butyl ether	70	**680**		**0.66**	23		0.17	55		0.17	47		0.17	1.7		0.17	**100**		**0.17**
Tert-Butyl Alcohol	100	61		5.6	**420**		**1.4**	**160**		**1.4**	**4400**	**E**	**1.4**	20		1.4	100		1.4
SEMIVOLATILE ORGANICS BY GC/MS																			
Bis(2-ethylhexyl)phthalate	3	ND		1.5	ND		1.5	ND		1.5	ND		1.5	ND		1.5	ND		1.5
SEMIVOLATILE ORGANICS BY GC/MS-SIM																			
Benzo(a)anthracene	0.1	ND		0.02	ND		0.02	ND		0.02	ND		0.02	ND		0.02	ND		0.02
Benzo(a)pyrene	0.1	ND		0.02	ND		0.02	ND		0.02	ND		0.02	ND		0.02	ND		0.02
Benzo(b)fluoranthene	0.2	ND		0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.01
1,4-Dioxane	0.4	**1.25**		**0.0303**	**0.558**		**0.0303**	**2**		**0.0326**	**1.5**		**0.0314**	ND		0.0303	**14.2**		**0.0314**
TOTAL METALS																			
Aluminum, Total	200	25.5		3.27	**520**		**3.27**	**208**		**3.27**	**793**		**3.27**	**977**		**3.27**	9.45	J	3.27
Arsenic, Total	3	0.1856	J	0.165	1.159		0.165	0.3074	J	0.165	1.72		0.165	0.3319	J	0.165	0.1766	J	0.165
Beryllium, Total	1	0.1386	J	0.107	0.2284	J	0.107	ND		0.107	ND		0.107	**1.004**		**0.107**	ND		0.107
Iron, Total	300	**397**		**19.1**	**11800**		**19.1**	**390**		**19.1**	**3360**		**19.1**	**96900**		**19.1**	76.8		19.1
Lead, Total	5	ND		0.343	0.8106	J	0.343	ND		0.343	1.911		0.343	1.559		0.343	ND		0.343
Manganese, Total	50	**96.68**		**0.44**	**284.8**		**0.44**	**177**		**0.44**	**102.8**		**0.44**	**2065**		**0.44**	**473.1**		**0.44**
Sodium, Total	50000	**82000**		**29.3**	27900		29.3	**1290000**		**586**	**298000**		**29.3**	**484000**		**29.3**	**1300000**		**293**
GENERAL CHEMISTRY																			
Nitrogen, Ammonia	3000	230		24	94.4		24	**12900**		**48**	**3020**		**24**	185		48	**18400**		**240**

- J – estimated concentration, ND – non-detect

5.3.4 Annual Sampling Summary – Southern Remediation Management Unit (SRMU)

In December 2021, groundwater samples were collected from monitoring wells PL-1RR, PL-2, PL-3R, PL-4RR, PL-5R, PL-6RR, PL-7, PL-8R, PL-9R, TM-5, TM-6R, and TM-7, and analyzed for VOCs, SVOCs, metals, and general chemistry parameters. Analytical results from the December 2021 SRMU groundwater sampling event are summarized in **Table 8** and on **Figure 12**.

Targeted VOCs, SVOCs, and ammonia were detected at concentrations exceeding the GWQS in the groundwater samples collected from several monitoring wells. Several metals were detected at concentrations exceeding the GWQS in all groundwater samples. The following tables summarizes the analytical results.

Client Sample ID:	NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	PL-1RR			PL-2			PL-3R			PL-4RR			PL-6RR		
Lab Sample ID:		L2166200-01			L2166200-04			L2166200-02			L2166615-09			L2167389-01		
Date Sampled:		12/2/2021			12/2/2021			12/2/2021			12/3/2021			12/8/2021		
Matrix:		WATER			WATER			WATER			WATER			WATER		
ANALYTE	(ug/l)	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
VOLATILE ORGANICS BY GC/MS																
Benzene	1	2.5		0.08	0.32	J	0.08	0.51		0.08	ND		0.08	0.22	J	0.08
Tert-Butyl Alcohol	100	24		1.4	9.1	J	1.4	68		1.4	ND		1.4	38		1.4
SEMIVOLATILE ORGANICS BY GC/MS-SIM																
Benzo(a)anthracene	0.1	0.06	J	0.02	0.12		0.02	0.05	J	0.02	ND		0.02	0.04	J	0.02
1,4-Dioxane	0.4	0.126	J	0.0326	0.156		0.0314	2.42		0.0339	0.13	J	0.0326	0.477		0.0326
TOTAL METALS																
Aluminum, Total	200	10.8		3.27	318		3.27	16.8		3.27	104		3.27	489		3.27
Arsenic, Total	3	3.289		0.165	4.949		0.165	2.396		0.165	7.698		0.165	5.695		0.165
Iron, Total	300	6610		19.1	19200		19.1	9760		19.1	269		19.1	25300		19.1
Manganese, Total	50	468.9		0.44	22.34		0.44	123.8		0.44	22.39		0.44	581.2		0.44
Sodium, Total	50000	158000		29.3	261000		29.3	1200000		293	78100		29.3	486000		29.3
GENERAL CHEMISTRY																
Nitrogen, Ammonia	3000	989		24	3720		48	9120		24	201		24	5100		24

Client Sample ID:	NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	PL-8R			PL-9R			TM-5			TM-6R			TM-7		
Lab Sample ID:		L2168383-02			L2166200-03			L2166615-01			L2168151-07			L2168151-06		
Date Sampled:		12/13/2021			12/2/2021			12/3/2021			12/10/2021			12/10/2021		
Matrix:		WATER			WATER			WATER			WATER			WATER		
ANALYTE	(ug/l)	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
VOLATILE ORGANICS BY GC/MS																
Benzene	1	ND		0.08	ND		0.08	ND		0.08	18		0.08	0.2	J	0.08
Tert-Butyl Alcohol	100	1.4	J	1.4	ND		1.4	ND		1.4	6.2	J	1.4	300		1.4
SEMIVOLATILE ORGANICS BY GC/MS-SIM																
Benzo(a)anthracene	0.1	0.05	J	0.02	0.03	J	0.02	ND		0.02	0.02	J	0.02	ND		0.02
1,4-Dioxane	0.4	ND		0.033	0.0628	J	0.0326	0.205		0.0326	ND		0.0314	0.396		0.031
TOTAL METALS																
Aluminum, Total	200	171		3.27	18.1		3.27	57.8		3.27	22.9		3.27	6.06	J	3.27
Arsenic, Total	3	3.613		0.165	1.666		0.165	0.8375		0.165	2.008		0.165	8.241		0.165
Iron, Total	300	1930		19.1	5820		19.1	99.6		19.1	31300		19.1	11600		19.1
Manganese, Total	50	52.98		0.44	323		0.44	319.4		0.44	1194		0.44	5623		0.44
Sodium, Total	50000	23700		29.3	42600		29.3	279000		29.3	29500		29.3	105000		29.3
GENERAL CHEMISTRY																
Nitrogen, Ammonia	3000	168		24	237		24	240		24	3420		24	179		24

- J – estimated concentration, ND – non-detect

5.4 Light Non-Aqueous Phase Liquid (LNAPL)

A sheen and/or Light Non-Aqueous Phase Liquid (LNAPL) has been historically observed in monitoring wells PL-1RR and PL-2 (2015 through 2018), as well as during soil and groundwater investigation activities (temporary well SLF-TW-2) conducted in the AOC 13 area.

Various LNAPL Interim Remedial Measures (IRM), such as passive collection via absorbent socks and vacuum extraction, have been conducted since 1998. The potential presence of LNAPL will continue to be evaluated as part of the RI and, if encountered, will be fully delineated so that a remedial action can be designed to enable full LNAPL recovery.

6.0 REMEDIAL INVESTIGATION RECOMMENDATIONS

Soil and groundwater impacts are present within the area of AOC 13 – Former Oil Water Lagoons. As discussed in Section 1.0 and in accordance with TRSR 7:26E-4.2, the intent of the proposed RI activities is to delineate groundwater impacts and free product and/or residual product in the saturated and unsaturated zones pertaining to this AOC group. Soil will be delineated to the MGW standard in both the saturated and unsaturated zone, if applicable.

<u>Groundwater Delineation</u>

Thirteen (13) new monitoring wells are proposed for installation. During the installation of the proposed monitoring wells, all soil borings associated with the wells will be screened, and soil samples collected for EPH, VOCs, SVOCs, Fraction Organic Carbon, grain size, and metals analysis, for supplementary data purposes. The following table summarizes the details of the proposed monitoring wells. The locations of the proposed monitoring wells are illustrated on **Figure 13**.

Well ID	Proposed Depth	Screen Interval	Initial Groundwater Analysis	Notes
OL-1	Shallow GW Zone	*based on observed water table	VOCs, SVOCS, Metals, and Ammonia	• Provide additional hydraulic definition and monitoring beneath AOC-13 • Provide additional delineation for benzene in temporary well locations.
OL-1D	Intermediate GW Zone		VOCs, SVOCS, Metals, and Ammonia	• To assess current groundwater intermediate zone conditions
OL-2	Shallow GW Zone		VOCs, SVOCS, Metals, and Ammonia	• Provide additional hydraulic definition and monitoring beneath AOC-13 • Provide additional delineation for benzene in temporary well locations.
OL-3	Shallow GW Zone		VOCs, SVOCS, Metals, and Ammonia	• Provide additional hydraulic definition and monitoring beneath AOC-13 • Provide additional delineation for

				benzene in temporary well locations.
OL-4	Shallow GW Zone		VOCs, SVOCS, Metals, and Ammonia	• Provide additional hydraulic definition and monitoring beneath AOC-13 • Provide additional delineation for benzene in temporary well locations.
OL-5	Shallow GW Zone		VOCs, SVOCS, Metals, and Ammonia	• Provide additional hydraulic definition and monitoring beneath AOC-13 • Provide additional delineation for benzene in temporary well locations.
OL-5D	Intermediate GW Zone		VOCs, SVOCS, Metals, and Ammonia	• To assess current groundwater intermediate zone conditions
OL-6	Shallow GW Zone		VOCs, SVOCS, Metals, and Ammonia	• Provide additional hydraulic definition and monitoring beneath AOC-13 • Provide additional delineation for benzene in temporary well locations.
OL-6D	Intermediate GW Zone		VOCs, SVOCS, Metals, and Ammonia	• To assess current groundwater intermediate zone conditions
OL-7	Shallow GW Zone		VOCs, SVOCS, Metals, and Ammonia	• Provide additional hydraulic definition and monitoring beneath AOC-13 • Provide additional delineation for benzene in temporary well locations.
OL-8	Shallow GW Zone		VOCs, SVOCS, Metals, and Ammonia	• Provide additional hydraulic definition and monitoring beneath AOC-13 • Provide additional delineation for benzene in

				temporary well locations.
OL-9	Shallow GW Zone		VOCs, SVOCS, Metals, and Ammonia	• Provide additional hydraulic definition and monitoring beneath AOC-13 • Provide additional delineation for benzene in temporary well locations.
OL-10	Shallow GW Zone		VOCs, SVOCS, Metals, and Ammonia	• Provide additional hydraulic definition and monitoring beneath AOC-13 • Provide additional delineation for benzene in temporary well locations.

Approximately two weeks after well installation, groundwater samples will be collected from all newly installed monitoring wells and analyzed for VOCs, SVOCs, Metals, Ammonia, and Tentatively Identified Compounds (TICs). Groundwater samples will be collected in accordance with the QAPP (**Appendix B**).

<u>LNAPL Delineation & MGW Pathway</u>
A series of test pits will be installed within the footprint of AOC 13 to determine if LNAPL is present. If LNAPL is present in the test pit, additional borings or test pits will be installed to delineate the extent of the observed LNAPL. Initial proposed test pit locations are illustrated on **Figure 14**. The test pits will be installed to a depth just below groundwater. If field observations indicate potential impacts are present, soil samples will be collected from the test pit and analyzed for EPH, VOCs, and select BNs.

The proposed test pits will also be utilized to determine the depth of the unsaturated zone and collect soil samples to address the MGW pathway, if necessary.

6.1 Contingency Investigations

Specific locations have been proposed for monitoring wells and soil samples with the understanding that these are optimal locations (based on existing data) to allow for the delineation of impacts and to complete the remedial investigation of the specified AOCs. However, data derived from the new groundwater and soil samples may indicate that additional sampling is still necessary to delineate impacts and serve to complete the remedial investigation. If additional sampling is warranted, the LSRP of record will make a determination (based on existing data) of where further sampling points are needed and the additional investigation will move forward immediately, without the submittal of supplementary workplans. All investigation observations and analytical data will be summarized in the final RIR for the AOC group.

6.2 Quality Assurance Project Plan

Samples will be collected in accordance with the sampling procedures outlined in the Quality Assurance Project Plan (QAPP), which is included as **Appendix B**. The QAPP will provide guidance to the project team to ensure all field activities are completed in a manner consistent with the NJDEP and USEPA requirements and that all data produced is of sufficient quality to meet required standards. Analytical data packages will be presented in the New Jersey Reduced Deliverables format, including electronic data deliverables (EDDs).

6.3 Health and Safety Plan

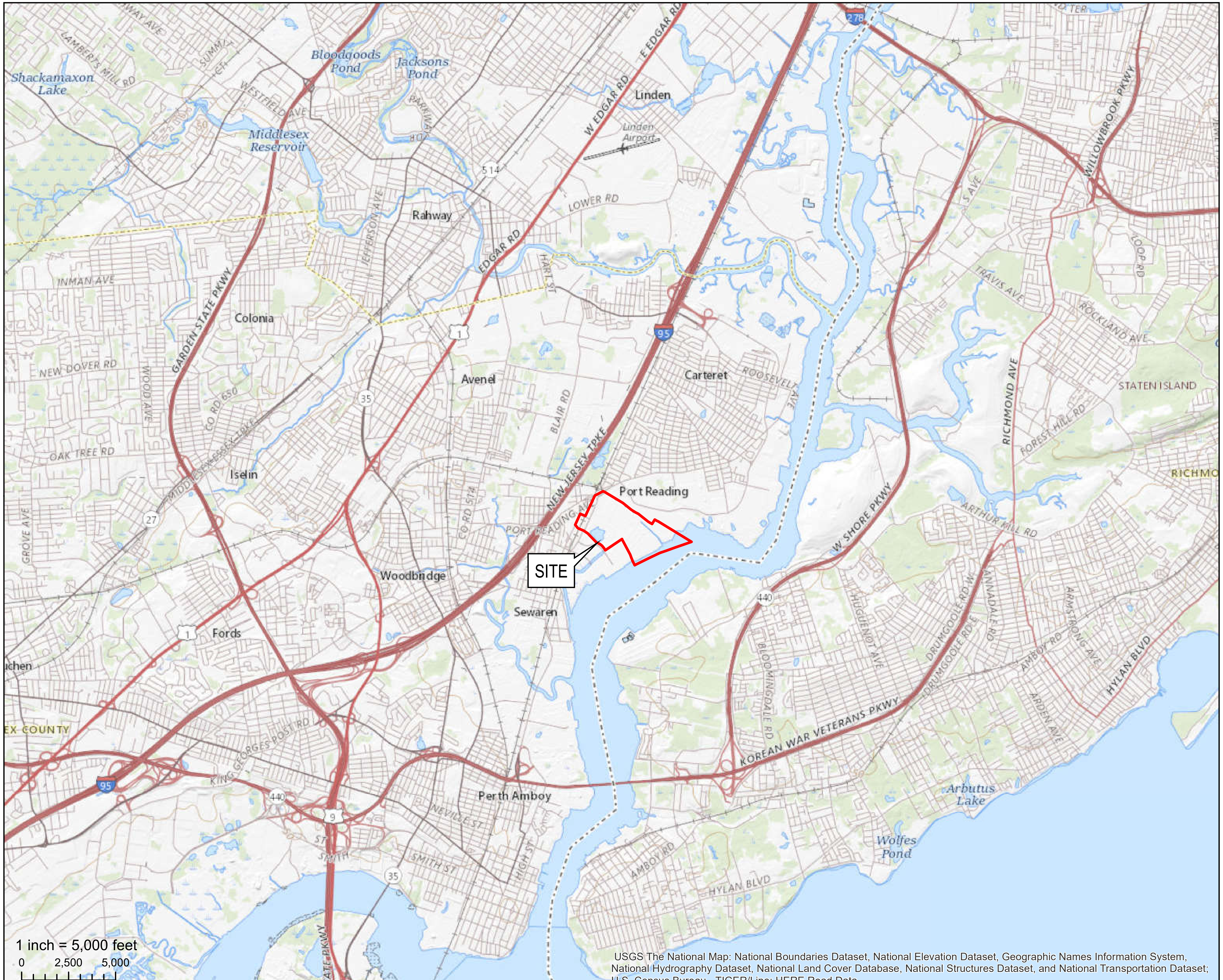
A Site-specific Health and Safety Plan (HASP) will be prepared in accordance with NJAC 7:26E-1.9. All Site personnel will be informed prior to performing any site activities of all health and safety protocols.

7.0 SCHEDULE

Hess will provide the NJDEP and USEPA with a minimum notice of 14 days for all field activities prior to commencement of work.

As discussed during the 2021 Q3 Quarterly meeting, RI activities for select AOCs would be conducted “At Risk.” “At Risk” work refers to investigation activities that are proposed in a RIW that is submitted to the NJDEP and USEPA for review. If the NJDEP and USEPA confirm that the RIW 90-day review timeframe cannot be met, the proposed investigation activities may be conducted “At Risk.” At the completion of all RI activities (once delineation is complete), a final RIR will be submitted that will document all investigation data and observations. Please note that this RIW is being submitted to the USEPA and NJDEP although will also most likely be conducted “At Risk”.

FIGURES



LEGEND

N

Port Reading Site Boundary

NEW JERSEY QUADRANGLE LOCATION:
53 - JERSEY CITY, NEW JERSEY

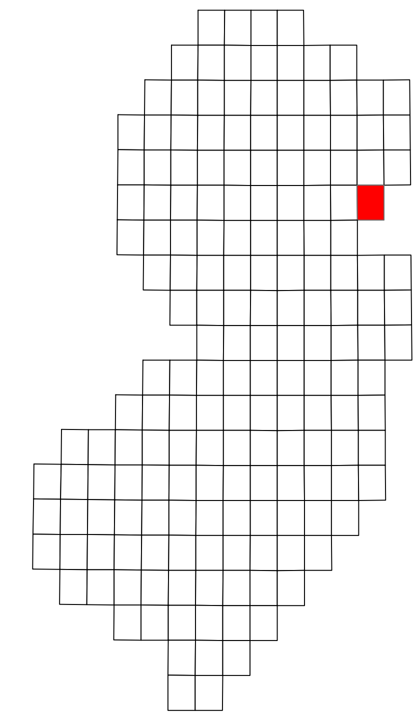


FIGURE 1:
USGS SITE LOCATION MAP

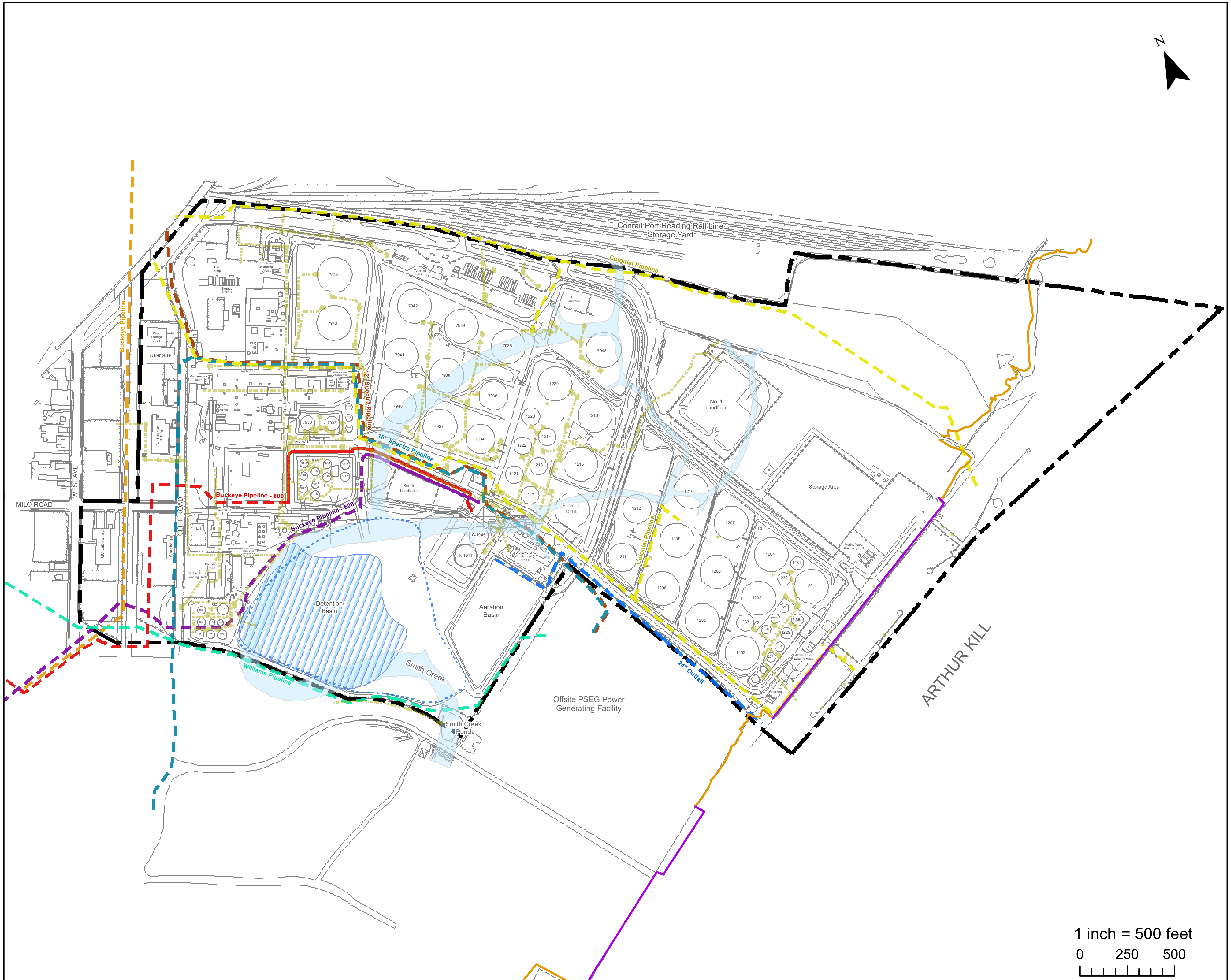
HESS CORPORATION
FORMER PORT READING TERMINAL
750 CLIFF ROAD
PORT READING, NEW JERSEY

Project #:	1114J01	**Drawn:**	4/16/2020
SRP PI#:	006148	**Drawn By:**	RC

Earth Systems
Environmental Engineering
1625 Highway 71, Belmar, NJ 07719
T. 732.739.6444 | F. 732.739.0451

This map was developed using New Jersey Department of Environmental Protection Geographic Information System Digital Data, but this secondary product has not been verified by NJDEP and is not state Authorized. Source: NAD 1983 (2011) New Jersey State Plane FIPS 2900 US FT.

Document Path: P:\ArcGIS\HESS Projects\1114J00 - Port Reading Hess\1114J01 - Sitewide\GIS\Port Reading - USGS Site Location Figure.mxd



LEGEND

- Site Boundary
- AOC 12 Extent
- Basin Present Extents
- Former Smith Creek Channel
- Shoreline
- Bulkhead

Pipelines

- 10" Spectra Natural Gas Pipeline
- 12" Spectra Pipeline
- 24" Outfall
- Buckeye Pipeline
- Buckeye Petroleum Pipeline - 608
- Buckeye Petroleum Pipeline - 609
- Colonial Pipeline
- Williams Pipeline
- Sitewide Utilities/Wastewater

Utility and Pipe Line Note:
- Solid Line: Above-ground
- Dotted Line: Underground

FIGURE: 2
Site Plan

HESS CORPORATION
FORMER PORT READING COMPLEX
750 CLIFF ROAD
PORT READING, NEW JERSEY

Project #:	1114J01	**Drawn:**	03/25/2021
SRP PI#:	006148	**Drawn By:**	AE

Earth Systems
Environmental Engineering
1625 Highway 71, Belmar, NJ 07719
T. 732.739.6444 | F. 732.739.0451

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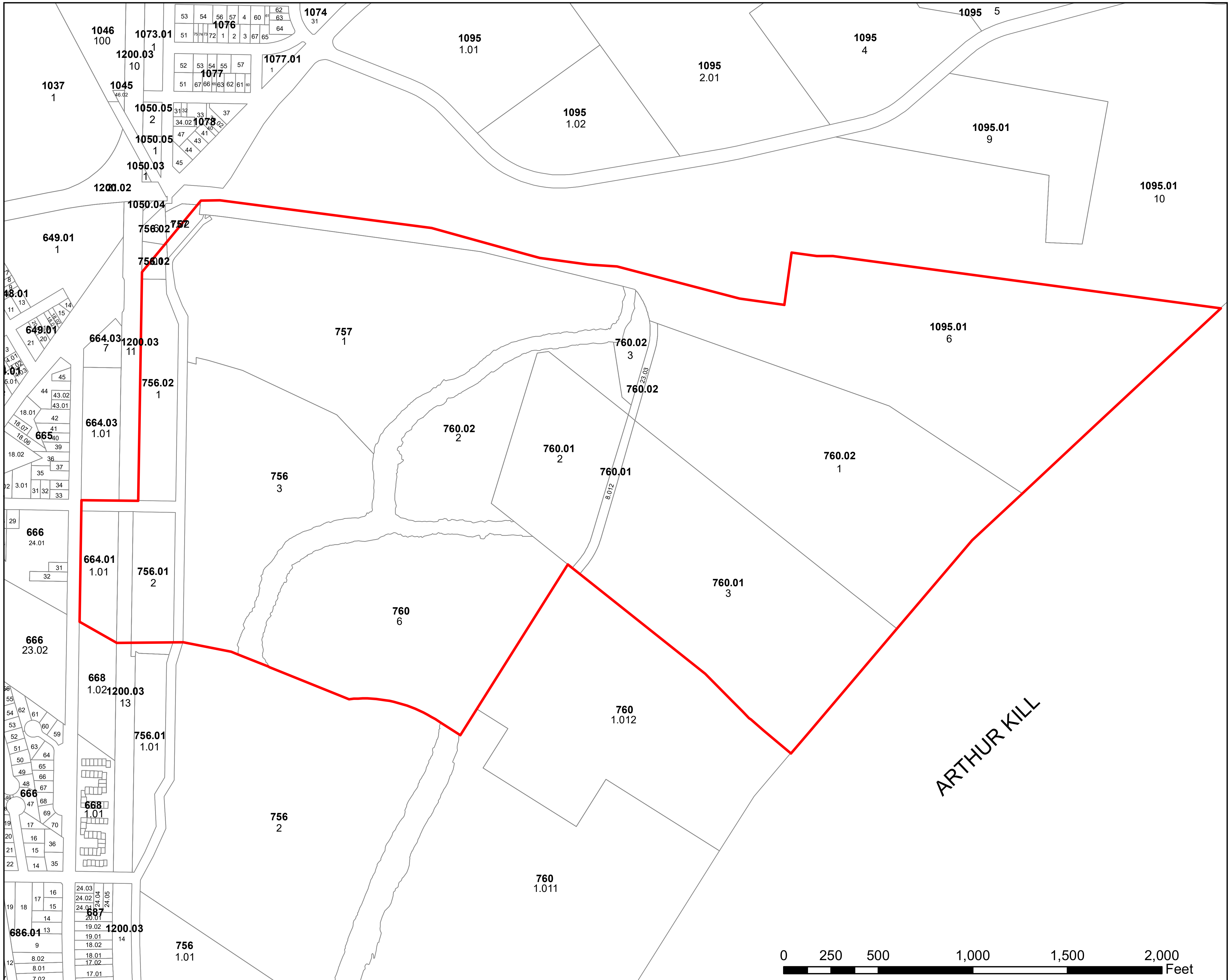
Source: NAD 1983 (2011) New Jersey State Plane FIPS 2900 US FT.



LEGEND

Site Boundary

Tax Parcels

N

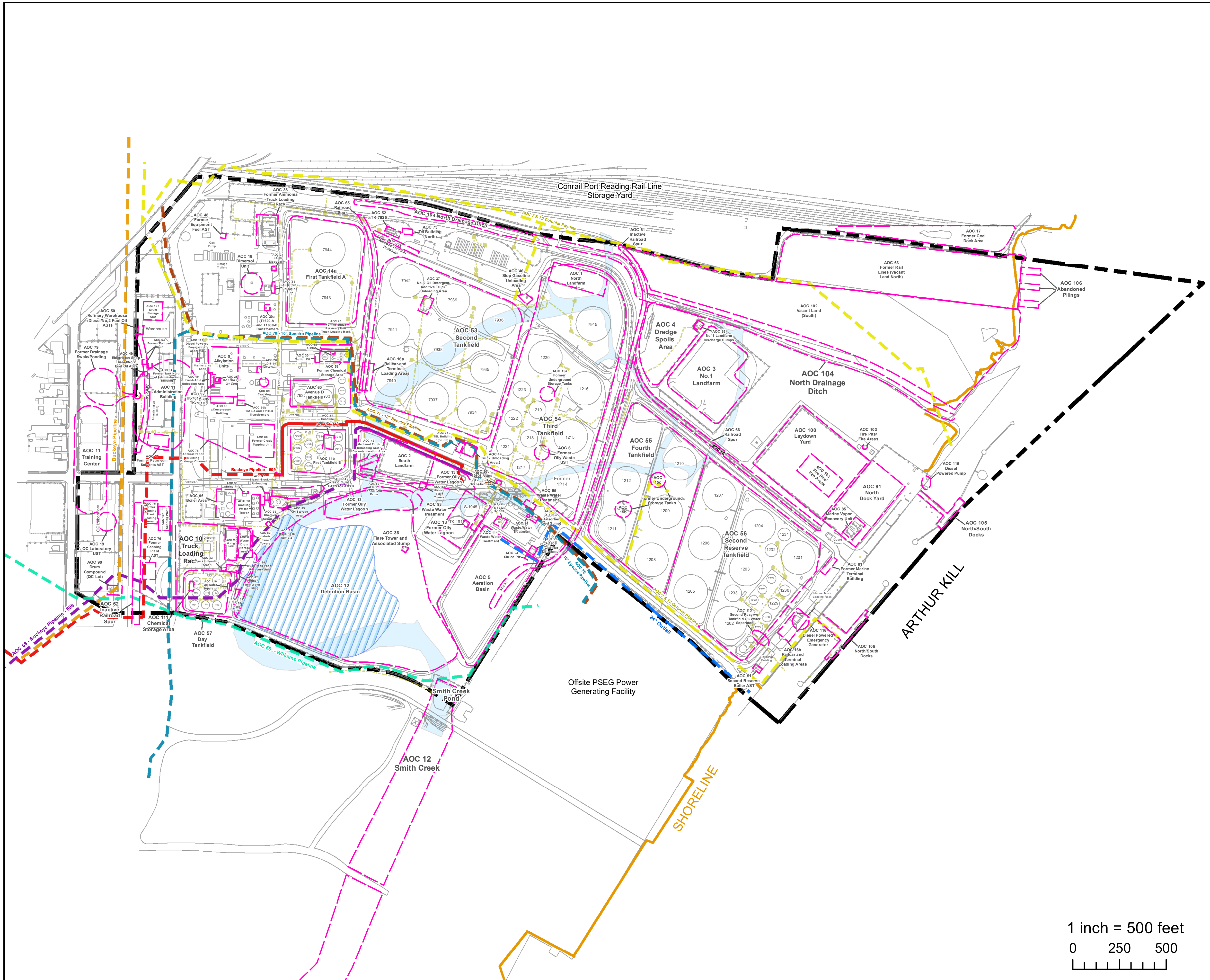
FIGURE: 3

TAX MAP

HESS CORPORATION
FORMER PORT READING COMPLEX
750 CLIFF ROAD
PORT READING, NEW JERSEY

Project #:	1114J01	**Drawn:**	04/22/2022
SRP PI#:	006148	**Drawn By:**	RC

Earth Systems
Environmental Engineering
1625 Highway 71, Belmar, NJ 07719
T. 732.739.6444 | F. 732.739.0451



LEGEND

- AOC Boundary
- Sitewide Utilities
- Shoreline
- Site Boundary
- Detention Basin Current Extents
- Former Smith Creek Channel

Pipelines

- 10" Spectra Natural Gas Pipeline
- 12" Spectra Pipeline
- 24" Outfall
- Buckeye Pipeline
- Buckeye Petroleum Pipeline - 608
- Buckeye Petroleum Pipeline - 609
- Colonial Pipeline
- Unknown Pipeline/ Utility
- Williams Pipeline

Pipelines:
- Solid Line: Aboveground
- Dotted Line: Underground

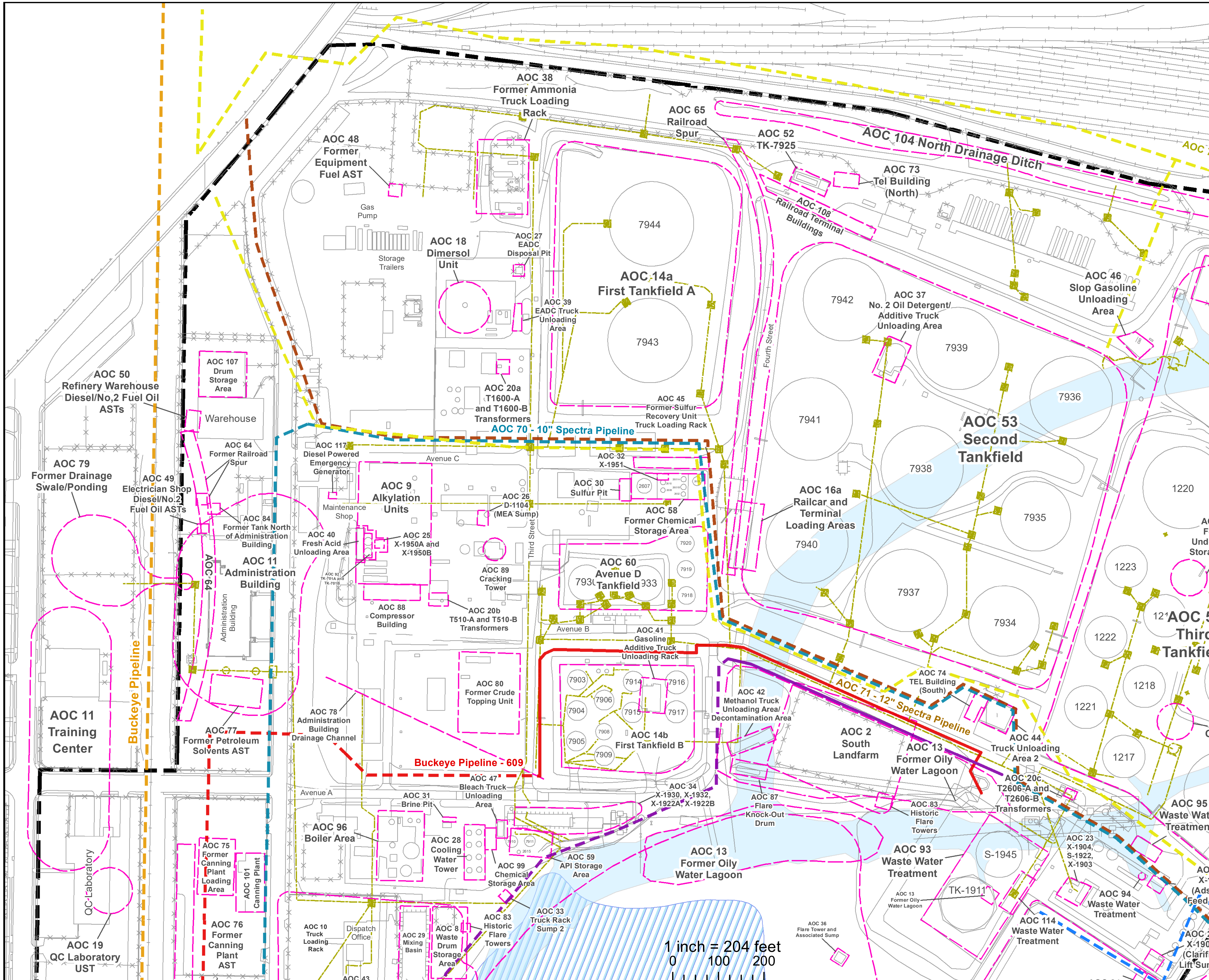
FIGURE: 4
AREAS OF CONCERN MAP

HESS CORPORATION
FORMER PORT READING COMPLEX
750 CLIFF ROAD
PORT READING, NEW JERSEY

Project #:	1114J01	**Drawn:**	2/24/2021
SRP PI#:	006148	**Drawn By:**	KJ/RC

Earth Systems
Environmental Engineering
1625 Highway 71, Belmar, NJ 07719
T. 732.739.6444 | F. 732.739.0451

This map was developed using New Jersey Department of Environmental Protection Geographic Information System Digital Data, but this secondary product has not been verified by NJDEP and is not state Authorized.
Source: NAD 1983 (2011) New Jersey State Plane FIPS 2900 US FT.



LEGEND

N

- AOC Boundary
- Sitewide Utilities
- Underground Utility Lines
- Detention Basin Current Extents
- Site Boundary

Pipelines

- 10" Spectra Natural Gas Pipeline
- 12" Spectra Pipeline
- 24" Outfall
- Buckeye Pipeline
- Buckeye Petroleum Pipeline - 608
- Buckeye Petroleum Pipeline - 609
- Colonial Pipeline
- Unknown Pipeline/ Utility
- Williams Pipeline

Pipelines:
Solid Line: Aboveground
Dotted Line: Underground

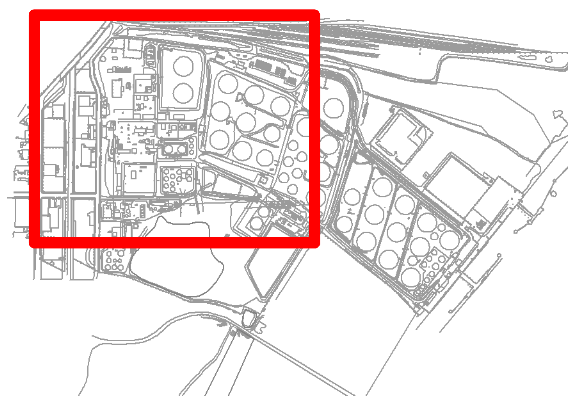


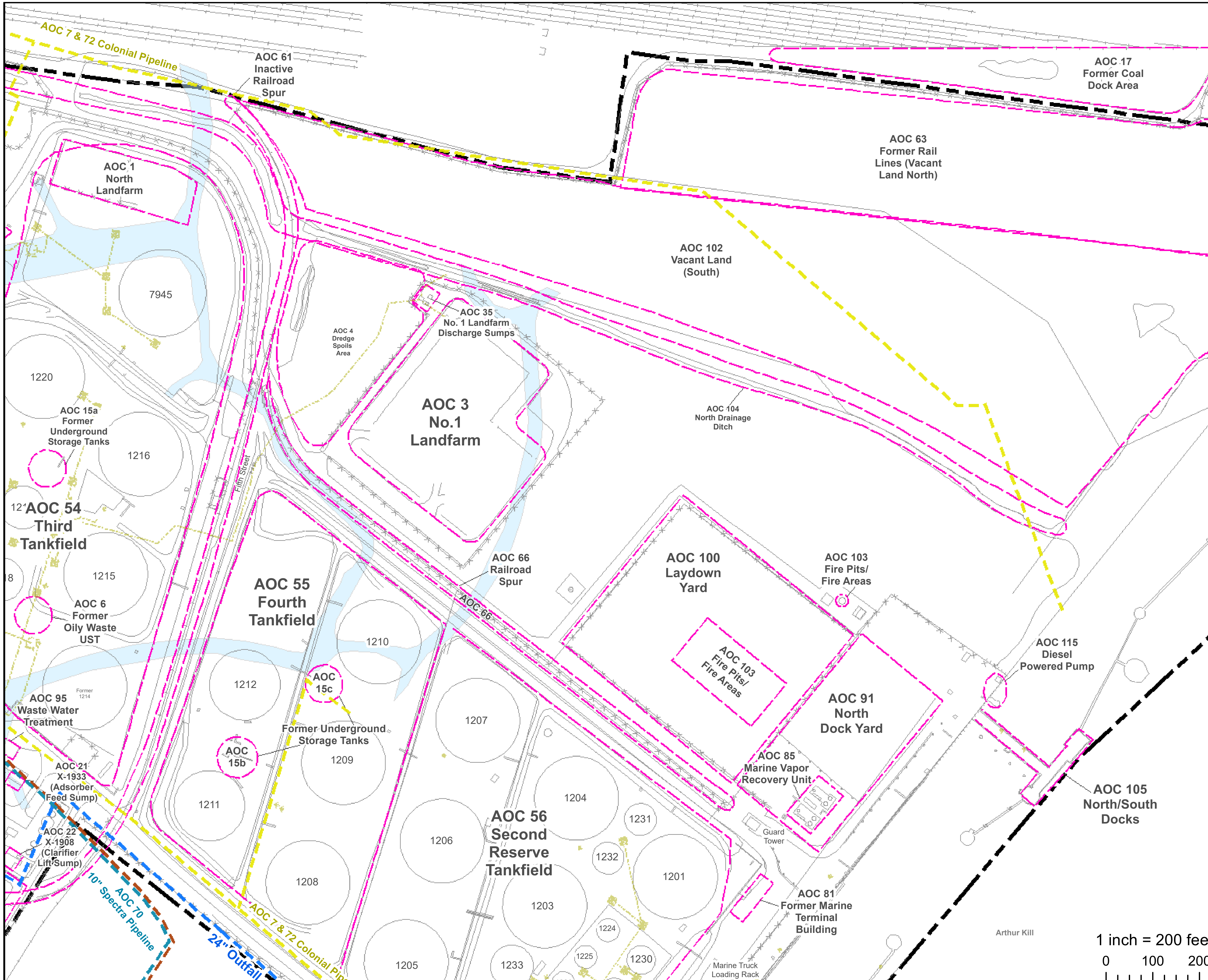
FIGURE: 4.1
AREAS OF CONCERN MAP

HESS CORPORATION
FORMER PORT READING COMPLEX
750 CLIFF ROAD
PORT READING, NEW JERSEY

Project #:	1114J01	**Drawn:**	2/25/2021
SRP PI#:	006148	**Drawn By:**	KJ,RC

Earth Systems
Environmental Engineering
1625 Highway 71, Belmar, NJ 07719
T. 732.739.6444 | F. 732.739.0451

This map was developed using New Jersey Department of Environmental Protection Geographic Information System Digital Data, but this secondary product has not been verified by NJDEP and is not state authorized. Source: NAD 1983 (2011) New Jersey State Plane FIPS 2900 US FT.



LEGEND

- AOC Boundary
- Underground Utility/Wastewater System
- Detention Basin Current Extents
- Site Boundary

Pipelines

- 10" Spectra Natural Gas Pipeline
- 12" Spectra Pipeline
- 24" Outfall
- Buckeye Pipeline
- Buckeye Petroleum Pipeline - 608
- Buckeye Petroleum Pipeline - 609
- Colonial Pipeline
- Unknown Pipeline/ Utility
- Williams Pipeline

Pipelines:
- Solid Line: Aboveground
- Dotted Line: Underground

FIGURE: 4.2
AREAS OF CONCERN MAP

HESS CORPORATION
FORMER PORT READING COMPLEX
750 CLIFF ROAD
PORT READING, NEW JERSEY

Project #:	1114J01	Drawn:	2/26/2021
SRP PI#:	006148	Drawn By:	KJ,RC

Earth Systems
Environmental Engineering

1625 Highway 71, Belmar, NJ 07719
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Source: NAD 1983 (2011) New Jersey State Plane FIPS 2900 US FT.

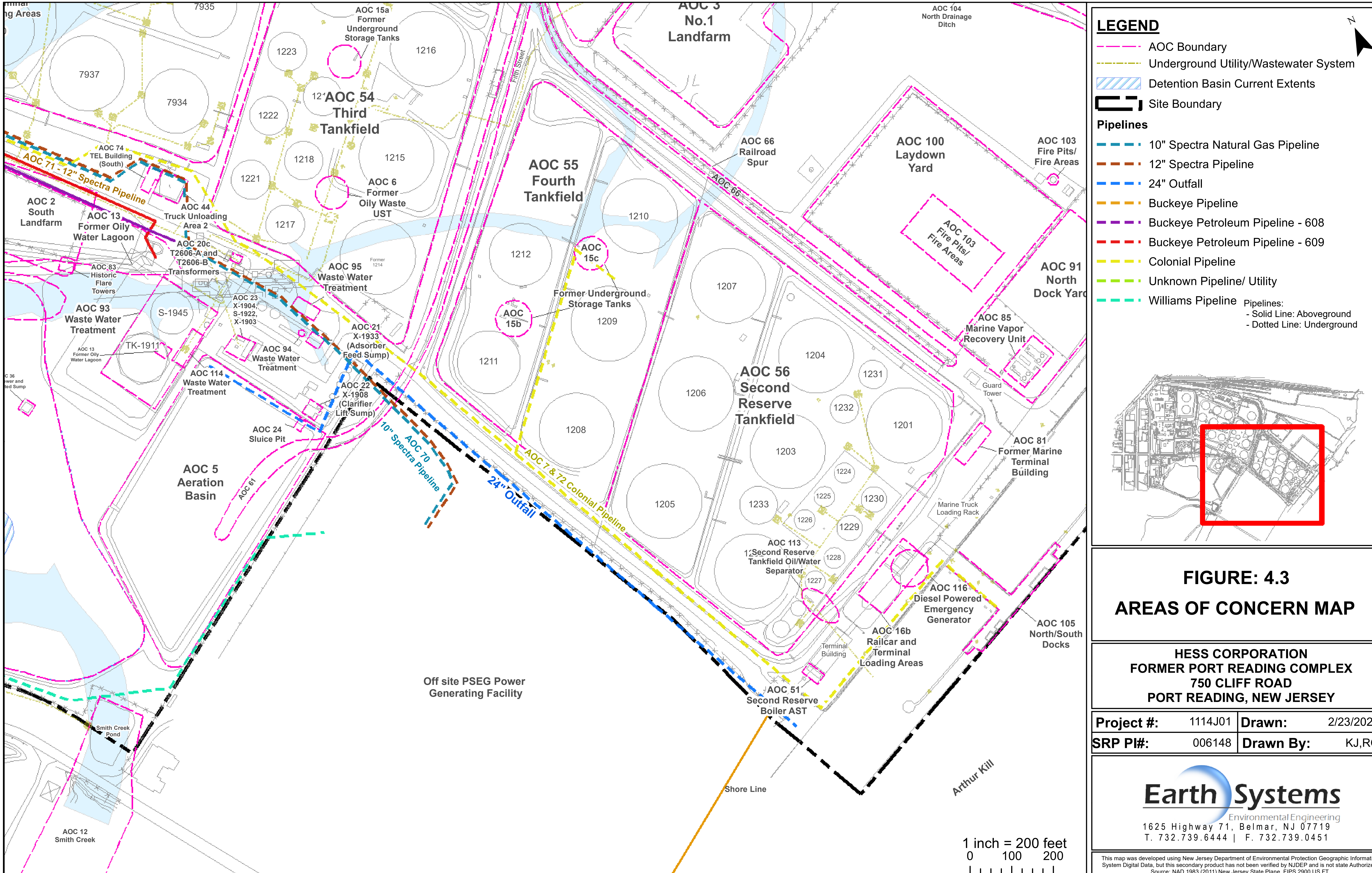

FIGURE: 4.3
AREAS OF CONCERN MAP

HESS CORPORATION
FORMER PORT READING COMPLEX
750 CLIFF ROAD
PORT READING, NEW JERSEY

Project #:	1114J01	**Drawn:**	2/23/2021
SRP PI#:	006148	**Drawn By:**	KJ,RC

Earth Systems
Environmental Engineering
1625 Highway 71, Belmar, NJ 07719
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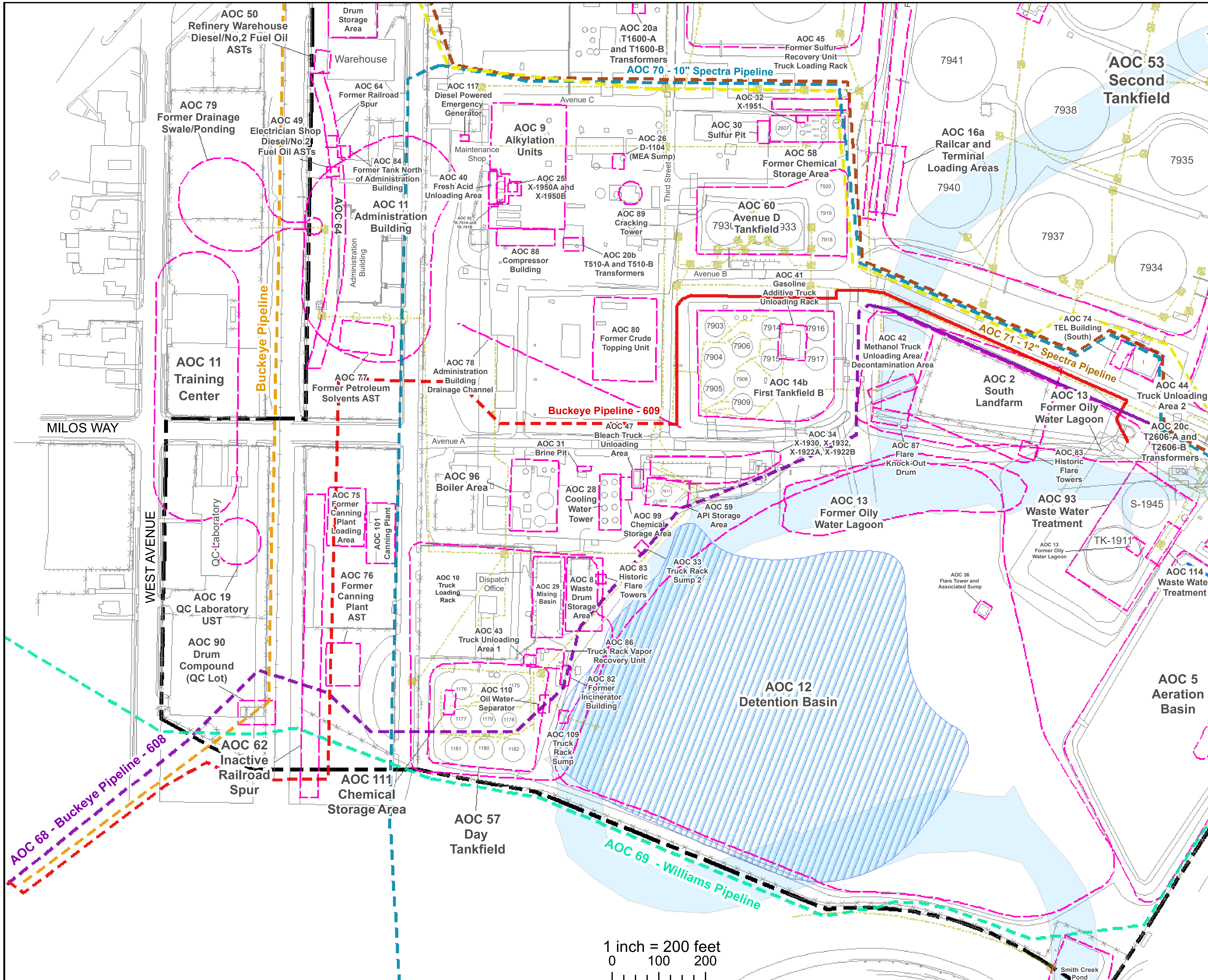

LEGEND

- AOC Boundary
- Underground Utility/Wastewater System
- Detention Basin Current Extents
- Site Boundary

Pipelines

- 10" Spectra Natural Gas Pipeline
- 12" Spectra Pipeline
- 24" Outfall
- Buckeye Pipeline
- Buckeye Petroleum Pipeline - 608
- Buckeye Petroleum Pipeline - 609
- Colonial Pipeline
- Unknown Pipeline/ Utility
- Williams Pipeline

Pipelines:
- Solid Line: Aboveground
- Dotted Line: Underground

N

FIGURE: 4.4

AREAS OF CONCERN MAP

HESS CORPORATION
FORMER PORT READING COMPLEX
750 CLIFF ROAD
PORT READING, NEW JERSEY

Project #:	1114J01	**Drawn:**	2/23/2021
SRP PI#:	006148	**Drawn By:**	KJ,RC

Earth Systems
Environmental Engineering
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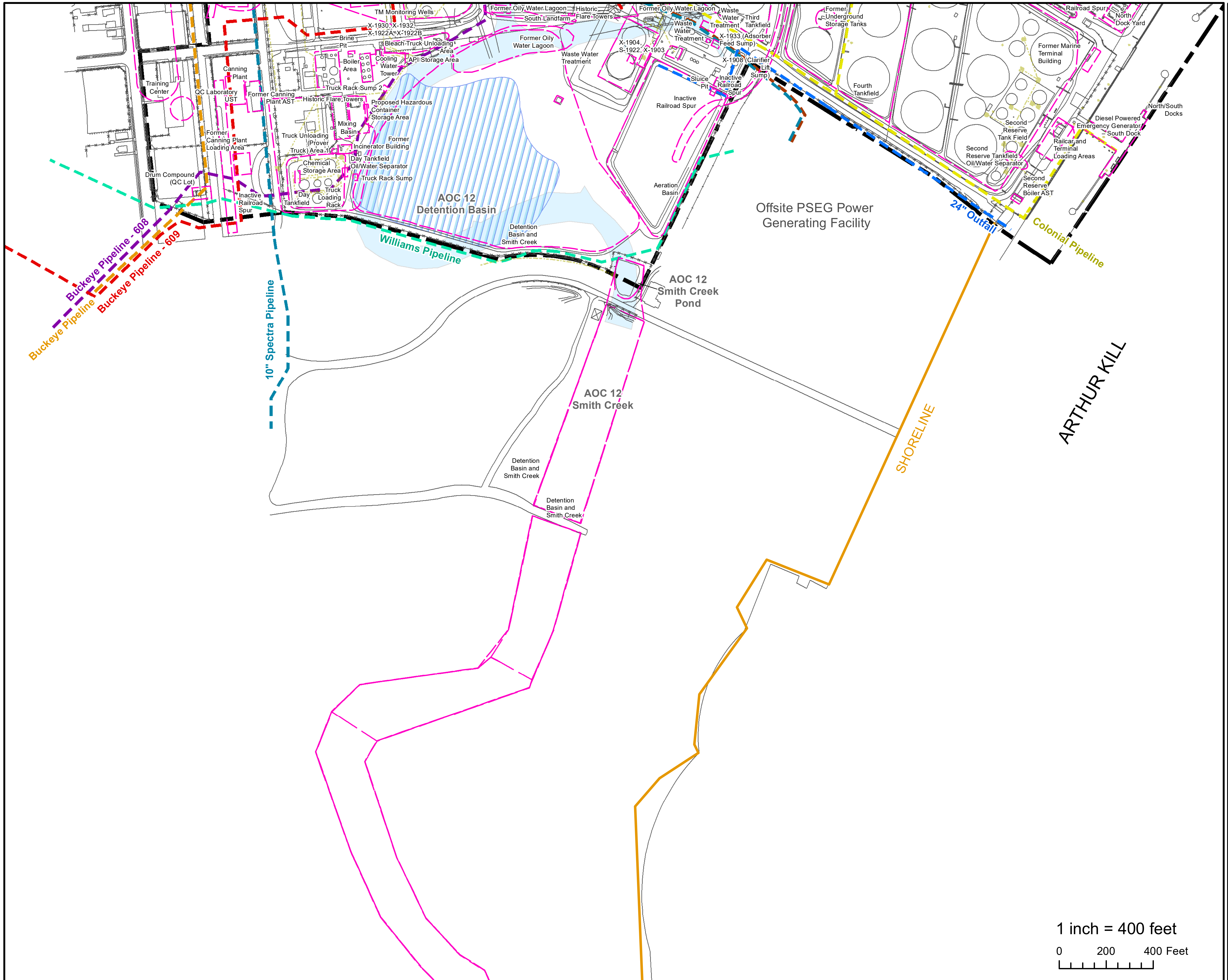
This map was developed using New Jersey Department of Environmental Protection Geographic Information System Digital Data, but this secondary product has not been verified by NJDEP and is not state Authorized. Source: NAD 1983 (2011) New Jersey State Plane FIPS 2900 US FT.



LEGEND

- AOC Boundary
- Sitewide Utility/Wastewater System
- Shoreline
- Site Boundary
- Detention Basin Current Extents

Pipelines

- 10" Spectra Natural Gas Pipeline
- 12" Spectra Pipeline
- 24" Outfall
- Buckeye Pipeline
- Buckeye Petroleum Pipeline - 608
- Buckeye Petroleum Pipeline - 609
- Colonial Pipeline
- Unknown Pipeline/ Utility
- Williams Pipeline

Pipelines:
- Solid Line: Aboveground
- Dotted Line: Underground

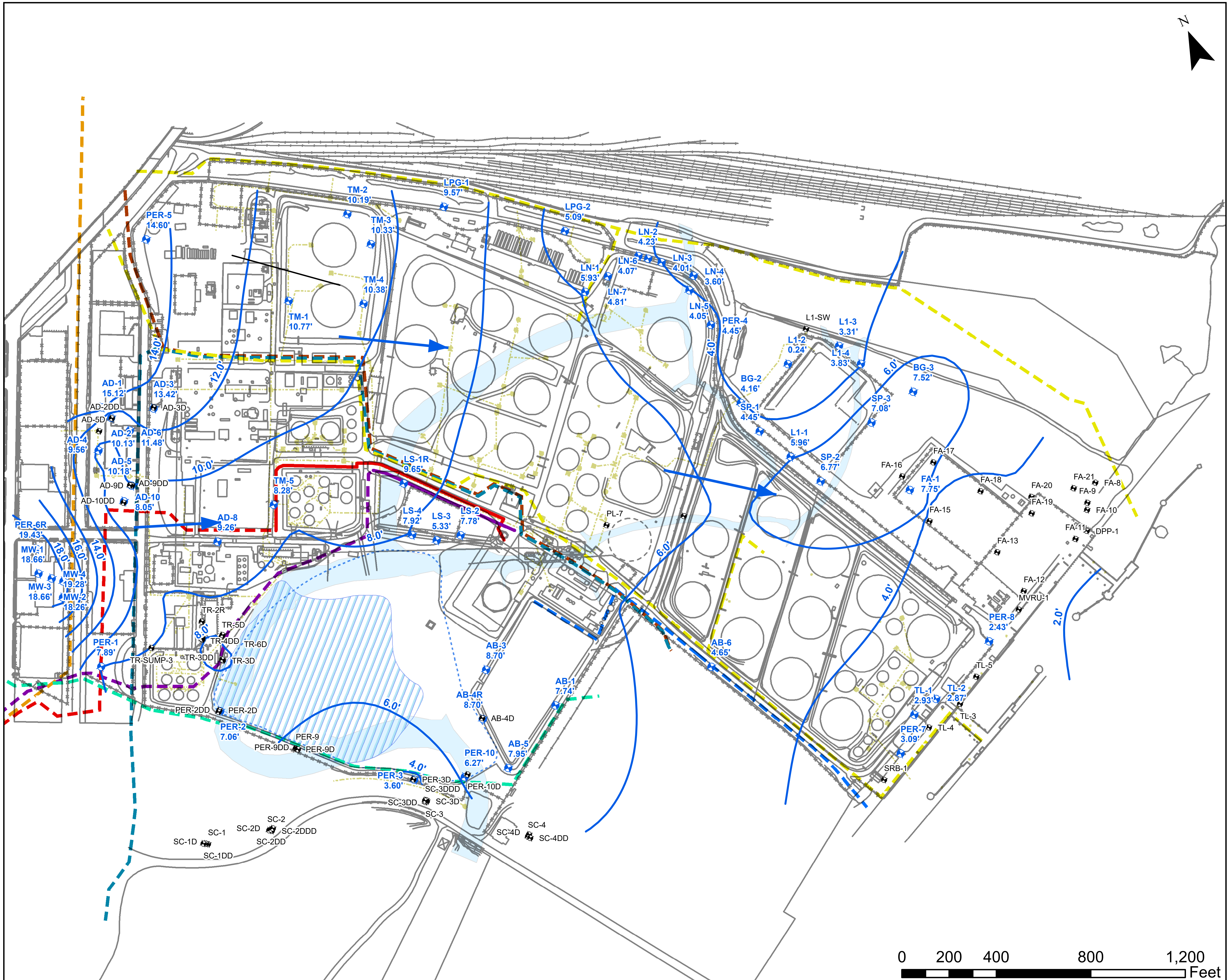
FIGURE: 4.5
AREAS OF CONCERN MAP

HESS CORPORATION
FORMER PORT READING COMPLEX
750 CLIFF ROAD
PORT READING, NEW JERSEY

Project #:	1114J01	**Drawn:**	2/25/2021
SRP PI#:	006148	**Drawn By:**	KJ,AE

Earth Systems
Environmental Engineering
1625 Highway 71, Belmar, NJ 07719
T. 732.739.6444 | F. 732.739.0451

This map was developed using New Jersey Department of Environmental Protection Geographic Information System Digital Data, but this secondary product has not been verified by NJDEP and is not state Authorized. Source: NAD 1983 (2011) New Jersey State Plane FIPS 2900 US FT.



LEGEND

- Gauged Monitoring Well
- Monitoring Well
- Groundwater Elevation Contour
- Groundwater Flow Direction
- Former Smith Creek Channel
- AOC 12 Extent
- Basin Present Extents
- 10" Spectra Natural Gas Pipeline
- 12" Spectra Pipeline
- 24" Outfall
- Buckeye Pipeline
- Buckeye Petroleum Pipeline - 608
- Buckeye Petroleum Pipeline - 609
- Colonial Pipeline
- Unknown Pipeline/ Utility
- Williams Pipeline
- Sitewide Utilities

NOTE:
1. All wells gauged on May 20, 2022
2. Only shallow screened (10-20' bgs) wells included.

FIGURE: 5a
MAY 2022
SITEWIDE GROUNDWATER ELEVATION CONTOUR - SHALLOW

HESS CORPORATION
FORMER PORT READING COMPLEX
750 CLIFF ROAD
PORT READING, NEW JERSEY

Project #:	1114J01	Drawn:	7/13/22
SRP PI#:	006148	Drawn By:	RC

Earth Systems
Environmental Engineering
1625 Highway 71, Belmar, NJ 07719
T. 732.739.6444 | F. 732.739.0451

LEGEND

- Surface Water Gauge
- Gauged Monitoring Well
- Monitoring Well
- Groundwater Elevation Contour
- Groundwater Flow Direction
- Former Smith Creek Channel
- AOC 12 Extent
- Basin Present Extents
- 10" Spectra Natural Gas Pipeline
- 12" Spectra Pipeline
- 24" Outfall
- Buckeye Pipeline
- Buckeye Petroleum Pipeline - 608
- Buckeye Petroleum Pipeline - 609
- Colonial Pipeline
- Unknown Pipeline/ Utility
- Williams Pipeline
- Sitewide Utilities

NOTE:
1. All wells gauged on May 20, 2022
2. Only shallow screened (25-35' bgs) wells included.

FIGURE: 5b
MAY 2022
SITEWIDE GROUNDWATER ELEVATION CONTOUR - INTERMEDIATE

HESS CORPORATION
FORMER PORT READING COMPLEX
750 CLIFF ROAD
PORT READING, NEW JERSEY

Project #:	1114J01	**Drawn:**	7/14/22
SRP PI#:	006148	**Drawn By:**	RC

Earth Systems
Environmental Engineering
1625 Highway 71, Belmar, NJ 07719
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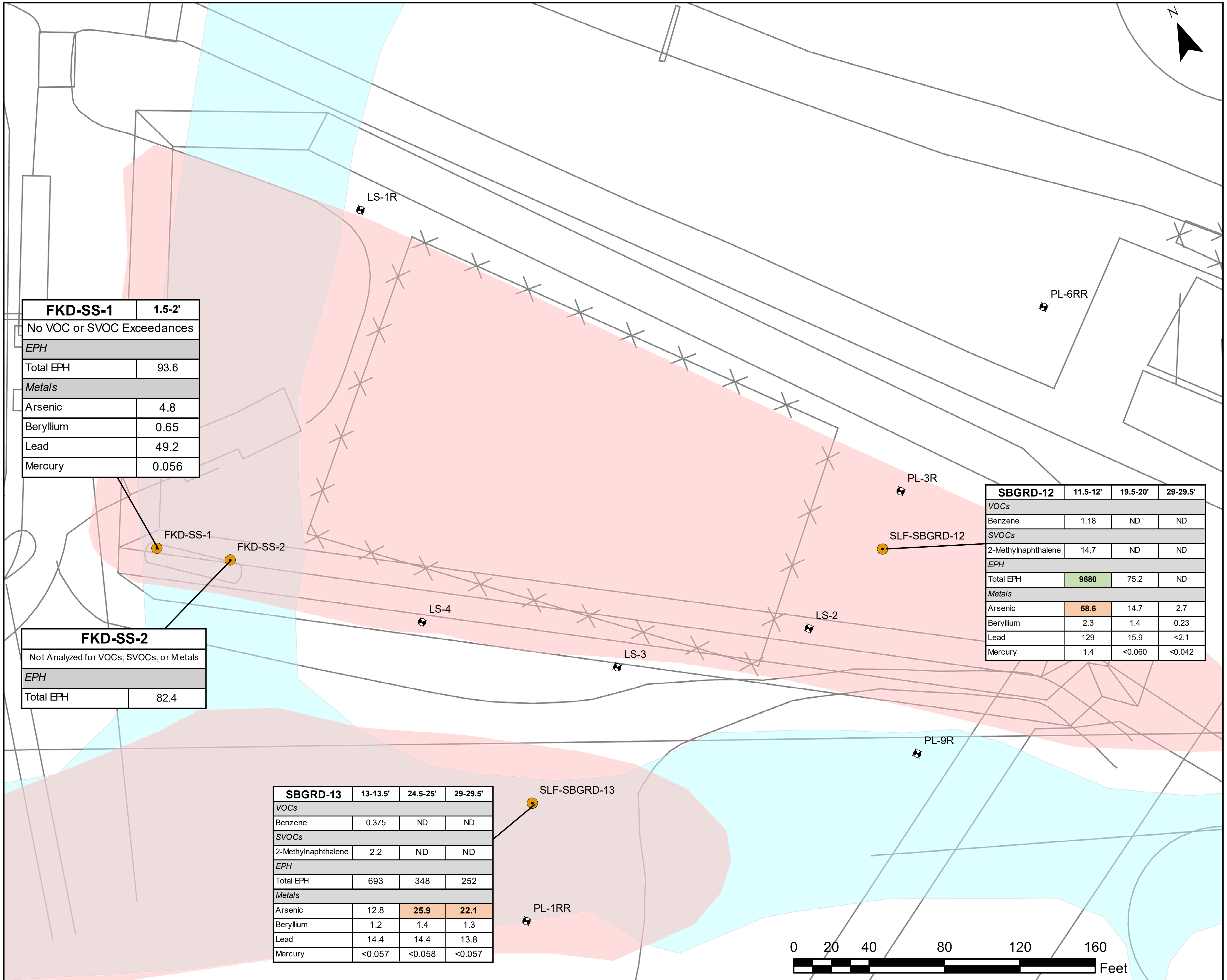
Document Path: A:\HESS Projects\1114J00 - Port Reading Hess\1114J01 - Sitewide\GIS_mxd\Oily Lagoon RIW\Oily Lagoon - Historic Soil Sample Data.mxd



FKD-SS-1	1.5-2'
No VOC or SVOC Exceedances	
EPH	
Total EPH	93.6
Metals	
Arsenic	4.8
Beryllium	0.65
Lead	49.2
Mercury	0.056

FKD-SS-2	
Not Analyzed for VOCs, SVOCs, or Metals	
EPH	
Total EPH	82.4

SBGRD-12	11.5-12'	19.5-20'	29-29.5'
VOCs			
Benzene	1.18	ND	ND
SVOCs			
2-Methylnaphthalene	14.7	ND	ND
EPH			
Total EPH	9680	75.2	ND
Metals			
Arsenic	58.6	14.7	2.7
Beryllium	2.3	1.4	0.23
Lead	129	15.9	<2.1
Mercury	1.4	<0.060	<0.042

SBGRD-13	13-13.5'	24.5-25'	29-29.5'
VOCs			
Benzene	0.375	ND	ND
SVOCs			
2-Methylnaphthalene	2.2	ND	ND
EPH			
Total EPH	693	348	252
Metals			
Arsenic	12.8	25.9	22.1
Beryllium	1.2	1.4	1.3
Lead	14.4	14.4	13.8
Mercury	<0.057	<0.058	<0.057

LEGEND

- Historic Sample Location
- Monitoring Well
- Former Oily Lagoon Extents
- Former Smith Creek Channel

	NJ-RI-SRS	NJ-RID-SRS	NJ-NRI-SRS	NJ-NRID-SRS
VOCs				
Benzene	2.2	3	11	16
SVOCs				
2-Methylnaphthalene	-	240	-	3300
Metals				
Arsenic	1100	19	5200	19
Beryllium	2000	160	9300	2600
Lead	-	400	-	800
Mercury	520000	23	-	390
Silver	-	390	-	6500

NOTES:
1. All results presented in ppm (mg/kg)
2. "FKD" samples taken September 2015
3. "SBGRD" samples taken September 2013
4. Former Oily Lagoon Extents drawn based off 1979 historic aerial.

NJ-RI-SRS: New Jersey - Residential Inhalation Exposure Path - Soil Remediation Standard
NJ-RID-SRS: New Jersey - Residential Dermal Exposure Path - Soil Remediation Standard
NJ-NRI-SRS: New Jersey - Non-Residential Inhalation Exposure Path - Soil Remedation Standard
NJ-NRID-SRS: New Jersey - Non-Residential Dermal Exposure Path - Soil Remediation Standard

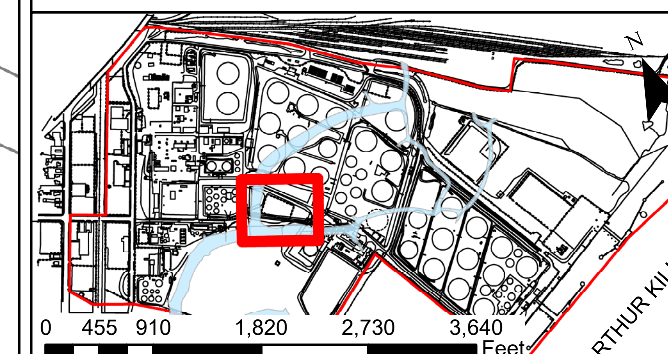


FIGURE: 6

Historic Soil Sample Results (AOC 13 and AOC 87)

HESS CORPORATION
FORMER PORT READING COMPLEX
750 CLIFF ROAD
PORT READING, NEW JERSEY

Project #:	1114J01	**Date:**	08/04/2022
SRP PI#:	006148	**Drawn By:**	RC

Earth Systems
Environmental Engineering

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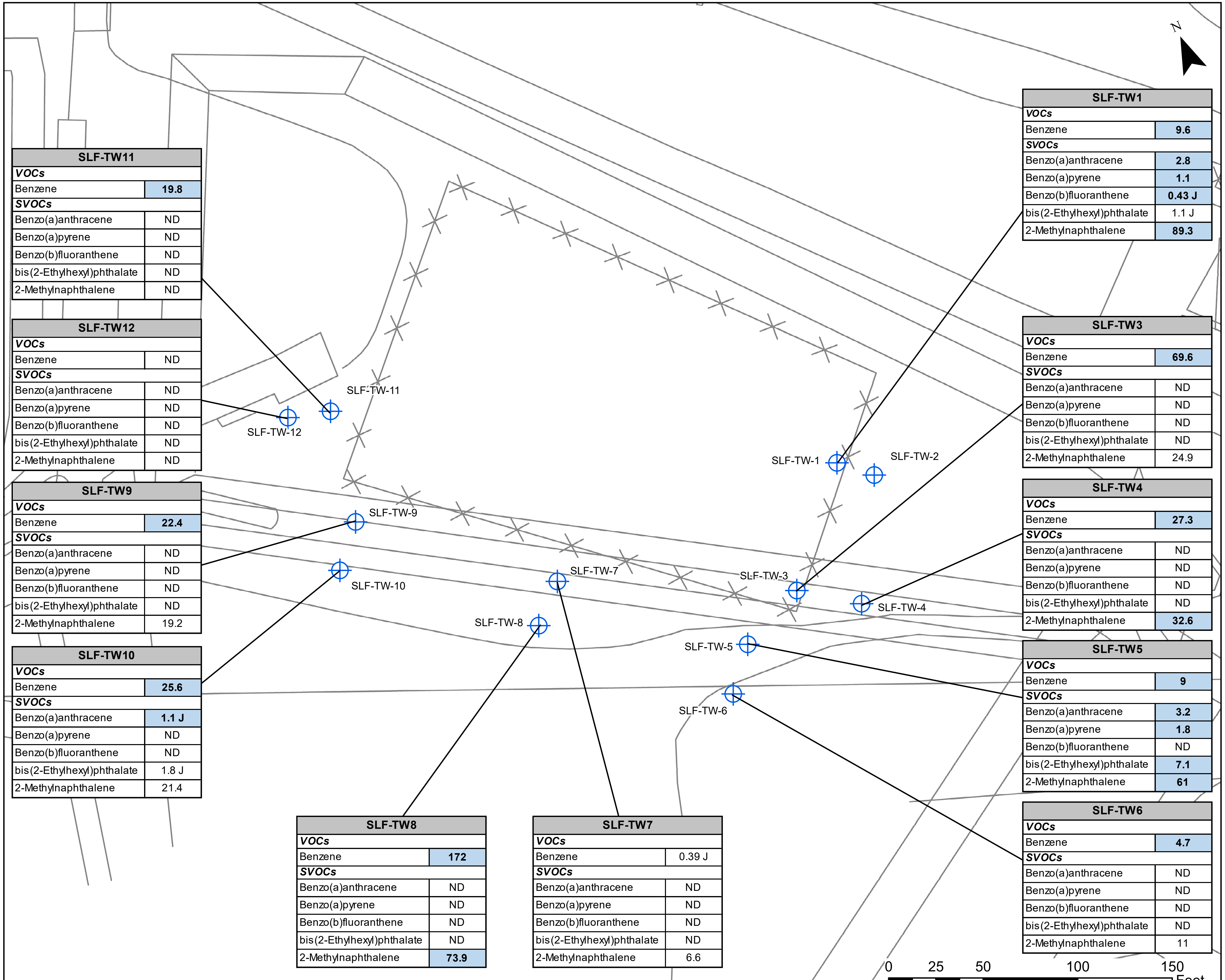


SLF-TW11	
VOCs	
Benzene	**19.8**
SVOCs	
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
bis(2-Ethylhexyl)phthalate	ND
2-Methylnaphthalene	ND

SLF-TW12	
VOCs	
Benzene	ND
SVOCs	
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
bis(2-Ethylhexyl)phthalate	ND
2-Methylnaphthalene	ND

SLF-TW9	
VOCs	
Benzene	**22.4**
SVOCs	
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
bis(2-Ethylhexyl)phthalate	ND
2-Methylnaphthalene	19.2

SLF-TW10	
VOCs	
Benzene	**25.6**
SVOCs	
Benzo(a)anthracene	**1.1 J**
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
bis(2-Ethylhexyl)phthalate	1.8 J
2-Methylnaphthalene	21.4

SLF-TW8	
VOCs	
Benzene	**172**
SVOCs	
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
bis(2-Ethylhexyl)phthalate	ND
2-Methylnaphthalene	**73.9**

SLF-TW7	
VOCs	
Benzene	0.39 J
SVOCs	
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
bis(2-Ethylhexyl)phthalate	ND
2-Methylnaphthalene	6.6

SLF-TW1	
VOCs	
Benzene	**9.6**
SVOCs	
Benzo(a)anthracene	**2.8**
Benzo(a)pyrene	**1.1**
Benzo(b)fluoranthene	**0.43 J**
bis(2-Ethylhexyl)phthalate	1.1 J
2-Methylnaphthalene	**89.3**

SLF-TW3	
VOCs	
Benzene	**69.6**
SVOCs	
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
bis(2-Ethylhexyl)phthalate	ND
2-Methylnaphthalene	24.9

SLF-TW4	
VOCs	
Benzene	**27.3**
SVOCs	
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
bis(2-Ethylhexyl)phthalate	ND
2-Methylnaphthalene	**32.6**

SLF-TW5	
VOCs	
Benzene	**9**
SVOCs	
Benzo(a)anthracene	**3.2**
Benzo(a)pyrene	**1.8**
Benzo(b)fluoranthene	ND
bis(2-Ethylhexyl)phthalate	**7.1**
2-Methylnaphthalene	**61**

SLF-TW6	
VOCs	
Benzene	**4.7**
SVOCs	
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
bis(2-Ethylhexyl)phthalate	ND
2-Methylnaphthalene	11

LEGEND

Temporary Well Location

NJ GROUNDWATER CRITERIA (ug/L)	
Benzene	**1**
Benzo(a)anthracene	**0.1**
Benzo(a)pyrene	**0.1**
Benzo(b)fluoranthene	**0.2**
bis(2-Ethylhexyl)phthalate	**3**
2-Methylnaphthalene	**30**

NOTES:
1. Results provided in parts per billion (ug/L)
2. SLF-TW-2 not sampled do to the presence of LNAPL in the well.

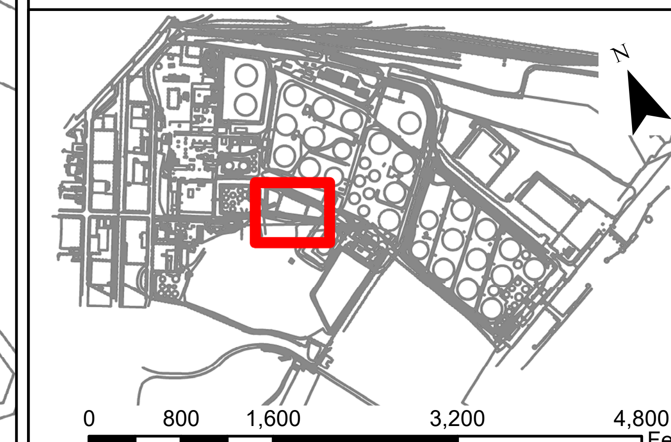


FIGURE: 7a
Temporary Well Analytical Results October 2009

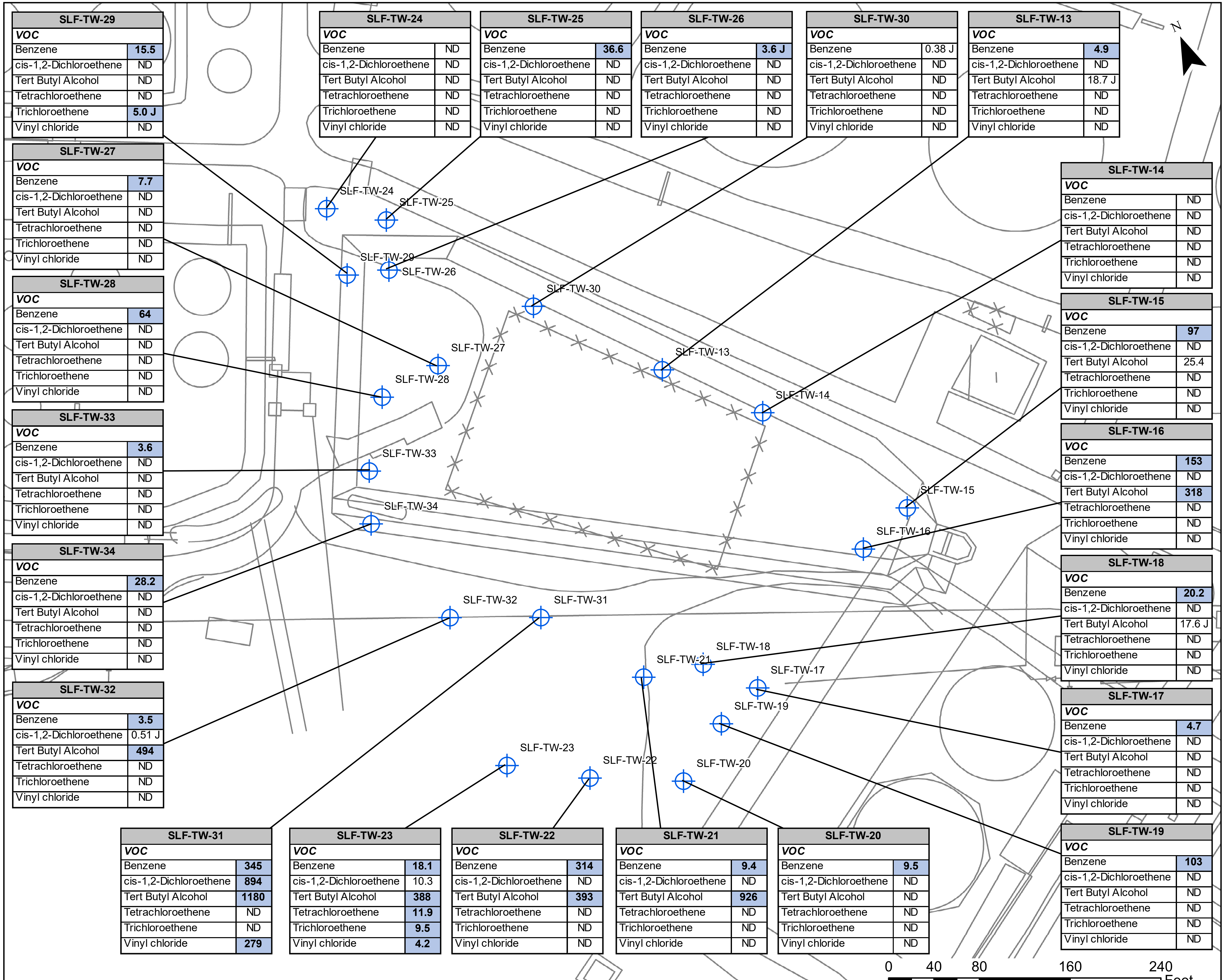
HESS CORPORATION
FORMER PORT READING COMPLEX
750 CLIFF ROAD
PORT READING, NEW JERSEY

Project #:	1114J01.22	**Date:**	08/04/2022
SRP PI#:	006148	**Drawn By:**	RC

Earth Systems
Environmental Engineering
1625 Highway 71, Belmar, NJ 07719
T. 732.739.6444

Source: NAD 1983 (2011) New Jersey State Plane FIPS 2900 US FT.

Document Path: A:\HESS Projects\1114J00 - Port Reading Hess\1114J01 - Sitewide\GIS_mxd\Oily Lagoon RIW\Oily Lagoon - Temporary Well Points 2009-10.mxd



SLF-TW-29	
VOC	
Benzene	15.5
cis-1,2-Dichloroethene	ND
Tert Butyl Alcohol	ND
Tetrachloroethene	ND
Trichloroethene	5.0 J
Vinyl chloride	ND

SLF-TW-24	
VOC	
Benzene	ND
cis-1,2-Dichloroethene	ND
Tert Butyl Alcohol	ND
Tetrachloroethene	ND
Trichloroethene	ND
Vinyl chloride	ND

SLF-TW-25	
VOC	
Benzene	36.6
cis-1,2-Dichloroethene	ND
Tert Butyl Alcohol	ND
Tetrachloroethene	ND
Trichloroethene	ND
Vinyl chloride	ND

SLF-TW-26	
VOC	
Benzene	3.6 J
cis-1,2-Dichloroethene	ND
Tert Butyl Alcohol	ND
Tetrachloroethene	ND
Trichloroethene	ND
Vinyl chloride	ND

SLF-TW-30	
VOC	
Benzene	0.38 J
cis-1,2-Dichloroethene	ND
Tert Butyl Alcohol	ND
Tetrachloroethene	ND
Trichloroethene	ND
Vinyl chloride	ND

SLF-TW-13	
VOC	
Benzene	4.9
cis-1,2-Dichloroethene	ND
Tert Butyl Alcohol	18.7 J
Tetrachloroethene	ND
Trichloroethene	ND
Vinyl chloride	ND

SLF-TW-27	
VOC	
Benzene	7.7
cis-1,2-Dichloroethene	ND
Tert Butyl Alcohol	ND
Tetrachloroethene	ND
Trichloroethene	ND
Vinyl chloride	ND

SLF-TW-28	
VOC	
Benzene	64
cis-1,2-Dichloroethene	ND
Tert Butyl Alcohol	ND
Tetrachloroethene	ND
Trichloroethene	ND
Vinyl chloride	ND

SLF-TW-33	
VOC	
Benzene	3.6
cis-1,2-Dichloroethene	ND
Tert Butyl Alcohol	ND
Tetrachloroethene	ND
Trichloroethene	ND
Vinyl chloride	ND

SLF-TW-34	
VOC	
Benzene	28.2
cis-1,2-Dichloroethene	ND
Tert Butyl Alcohol	ND
Tetrachloroethene	ND
Trichloroethene	ND
Vinyl chloride	ND

SLF-TW-32	
VOC	
Benzene	3.5
cis-1,2-Dichloroethene	0.51 J
Tert Butyl Alcohol	494
Tetrachloroethene	ND
Trichloroethene	ND
Vinyl chloride	ND

SLF-TW-14	
VOC	
Benzene	ND
cis-1,2-Dichloroethene	ND
Tert Butyl Alcohol	ND
Tetrachloroethene	ND
Trichloroethene	ND
Vinyl chloride	ND

SLF-TW-15	
VOC	
Benzene	97
cis-1,2-Dichloroethene	ND
Tert Butyl Alcohol	25.4
Tetrachloroethene	ND
Trichloroethene	ND
Vinyl chloride	ND

SLF-TW-16	
VOC	
Benzene	153
cis-1,2-Dichloroethene	ND
Tert Butyl Alcohol	318
Tetrachloroethene	ND
Trichloroethene	ND
Vinyl chloride	ND

SLF-TW-18	
VOC	
Benzene	20.2
cis-1,2-Dichloroethene	ND
Tert Butyl Alcohol	17.6 J
Tetrachloroethene	ND
Trichloroethene	ND
Vinyl chloride	ND

SLF-TW-17	
VOC	
Benzene	4.7
cis-1,2-Dichloroethene	ND
Tert Butyl Alcohol	ND
Tetrachloroethene	ND
Trichloroethene	ND
Vinyl chloride	ND

SLF-TW-19	
VOC	
Benzene	103
cis-1,2-Dichloroethene	ND
Tert Butyl Alcohol	ND
Tetrachloroethene	ND
Trichloroethene	ND
Vinyl chloride	ND

SLF-TW-31	
VOC	
Benzene	345
cis-1,2-Dichloroethene	894
Tert Butyl Alcohol	1180
Tetrachloroethene	ND
Trichloroethene	ND
Vinyl chloride	279

SLF-TW-23	
VOC	
Benzene	18.1
cis-1,2-Dichloroethene	10.3
Tert Butyl Alcohol	388
Tetrachloroethene	11.9
Trichloroethene	9.5
Vinyl chloride	4.2

SLF-TW-22	
VOC	
Benzene	314
cis-1,2-Dichloroethene	ND
Tert Butyl Alcohol	393
Tetrachloroethene	ND
Trichloroethene	ND
Vinyl chloride	ND

SLF-TW-21	
VOC	
Benzene	9.4
cis-1,2-Dichloroethene	ND
Tert Butyl Alcohol	926
Tetrachloroethene	ND
Trichloroethene	ND
Vinyl chloride	ND

SLF-TW-20	
VOC	
Benzene	9.5
cis-1,2-Dichloroethene	ND
Tert Butyl Alcohol	ND
Tetrachloroethene	ND
Trichloroethene	ND
Vinyl chloride	ND

LEGEND

Temporary Well Location

NJ Groundwater Quality	
Benzene	1
cis-1,2-Dichloroethene	70
Tert Butyl Alcohol	100
Tetrachloroethene	1
Trichloroethene	1
Vinyl chloride	1

NOTES:
1. Results provided in parts per billion (ug/L)

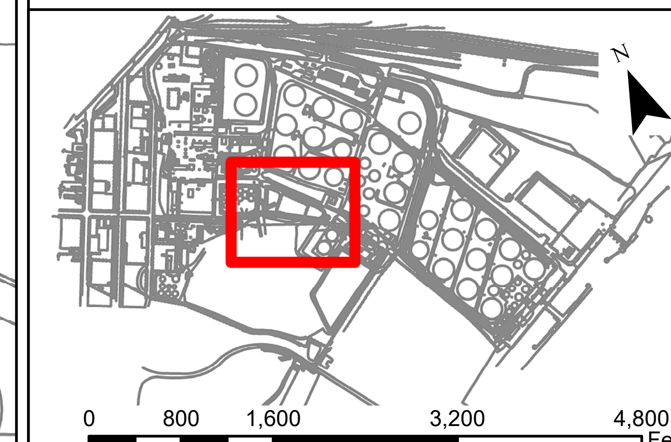


FIGURE: 7b
Temporary Well Analytical
September 2010
VOC Results

HESS CORPORATION
FORMER PORT READING COMPLEX
750 CLIFF ROAD
PORT READING, NEW JERSEY

Project #:	1114J01.22	**Date:**	07/25/2022
SRP PI#:	006148	**Drawn By:**	RC

Earth Systems
Environmental Engineering
1625 Highway 71, Belmar, NJ 07719
T. 732.739.6444

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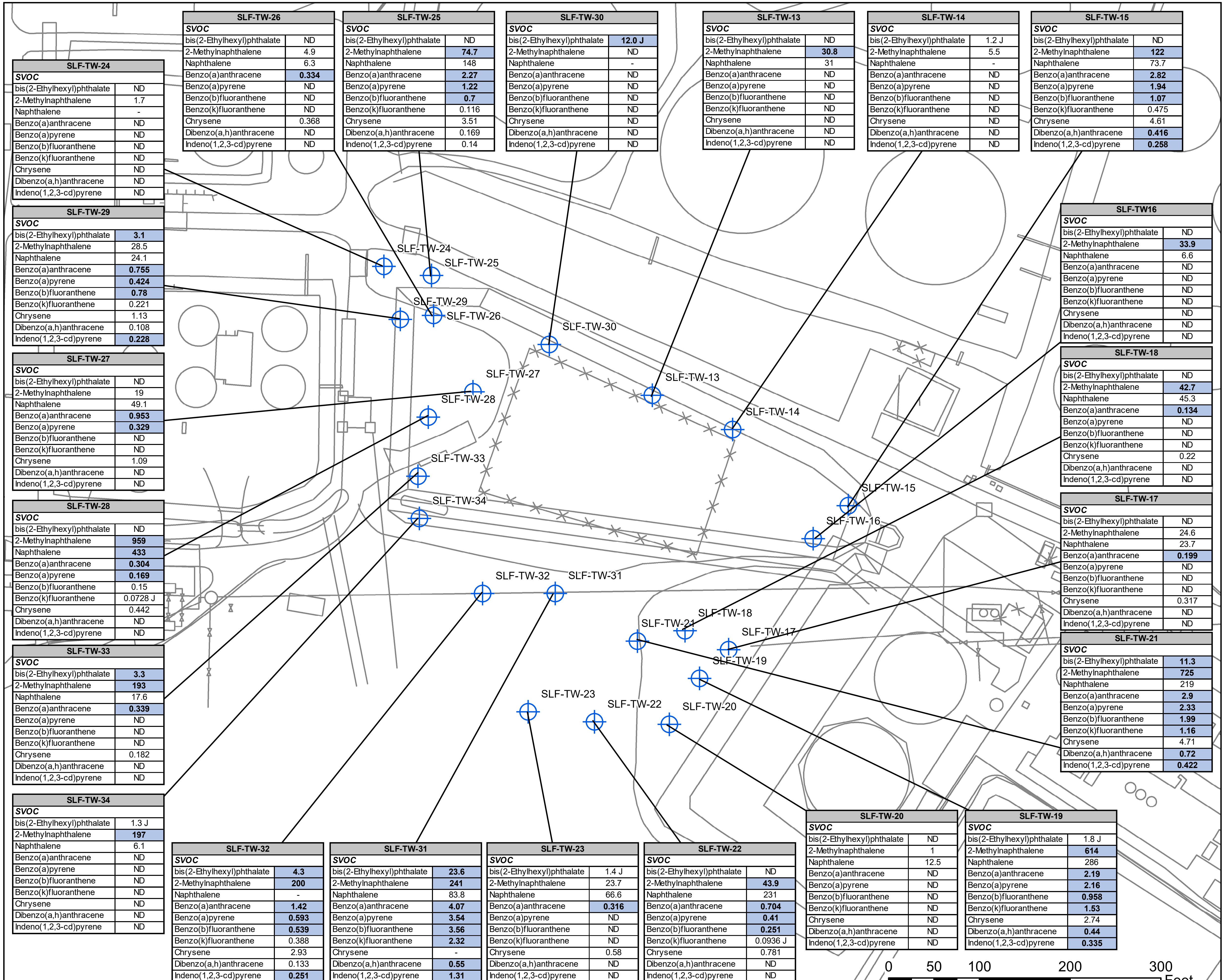

SLF-TW-24	
SVOC	
bis(2-Ethylhexyl)phthalate	ND
2-Methylnaphthalene	1.7
Naphthalene	-
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenzo(a,h)anthracene	ND
Indeno(1,2,3-cd)pyrene	ND

SLF-TW-29	
SVOC	
bis(2-Ethylhexyl)phthalate	3.1
2-Methylnaphthalene	28.5
Naphthalene	24.1
Benzo(a)anthracene	0.755
Benzo(a)pyrene	0.424
Benzo(b)fluoranthene	0.78
Benzo(k)fluoranthene	0.221
Chrysene	1.13
Dibenzo(a,h)anthracene	0.108
Indeno(1,2,3-cd)pyrene	0.228

SLF-TW-27	
SVOC	
bis(2-Ethylhexyl)phthalate	ND
2-Methylnaphthalene	19
Naphthalene	49.1
Benzo(a)anthracene	0.953
Benzo(a)pyrene	0.329
Benzo(b)fluoranthene	ND
Benzo(k)fluoranthene	ND
Chrysene	1.09
Dibenzo(a,h)anthracene	ND
Indeno(1,2,3-cd)pyrene	ND

SLF-TW-28	
SVOC	
bis(2-Ethylhexyl)phthalate	ND
2-Methylnaphthalene	959
Naphthalene	433
Benzo(a)anthracene	0.304
Benzo(a)pyrene	0.169
Benzo(b)fluoranthene	0.15
Benzo(k)fluoranthene	0.0728 J
Chrysene	0.442
Dibenzo(a,h)anthracene	ND
Indeno(1,2,3-cd)pyrene	ND

SLF-TW-33	
SVOC	
bis(2-Ethylhexyl)phthalate	3.3
2-Methylnaphthalene	193
Naphthalene	17.6
Benzo(a)anthracene	0.339
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(k)fluoranthene	ND
Chrysene	0.182
Dibenzo(a,h)anthracene	ND
Indeno(1,2,3-cd)pyrene	ND

SLF-TW-34	
SVOC	
bis(2-Ethylhexyl)phthalate	1.3 J
2-Methylnaphthalene	197
Naphthalene	6.1
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenzo(a,h)anthracene	ND
Indeno(1,2,3-cd)pyrene	ND

SLF-TW-26	
SVOC	
bis(2-Ethylhexyl)phthalate	ND
2-Methylnaphthalene	4.9
Naphthalene	6.3
Benzo(a)anthracene	0.334
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(k)fluoranthene	ND
Chrysene	0.368
Dibenzo(a,h)anthracene	ND
Indeno(1,2,3-cd)pyrene	ND

SLF-TW-25	
SVOC	
bis(2-Ethylhexyl)phthalate	ND
2-Methylnaphthalene	74.7
Naphthalene	148
Benzo(a)anthracene	2.27
Benzo(a)pyrene	1.22
Benzo(b)fluoranthene	0.7
Benzo(k)fluoranthene	0.116
Chrysene	3.51
Dibenzo(a,h)anthracene	0.169
Indeno(1,2,3-cd)pyrene	0.14

SLF-TW-30	
SVOC	
bis(2-Ethylhexyl)phthalate	12.0 J
2-Methylnaphthalene	ND
Naphthalene	-
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenzo(a,h)anthracene	ND
Indeno(1,2,3-cd)pyrene	ND

SLF-TW-13	
SVOC	
bis(2-Ethylhexyl)phthalate	ND
2-Methylnaphthalene	30.8
Naphthalene	31
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenzo(a,h)anthracene	ND
Indeno(1,2,3-cd)pyrene	ND

SLF-TW-14	
SVOC	
bis(2-Ethylhexyl)phthalate	1.2 J
2-Methylnaphthalene	5.5
Naphthalene	-
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenzo(a,h)anthracene	ND
Indeno(1,2,3-cd)pyrene	ND

SLF-TW-15	
SVOC	
bis(2-Ethylhexyl)phthalate	ND
2-Methylnaphthalene	122
Naphthalene	73.7
Benzo(a)anthracene	2.82
Benzo(a)pyrene	1.94
Benzo(b)fluoranthene	1.07
Benzo(k)fluoranthene	0.475
Chrysene	4.61
Dibenzo(a,h)anthracene	0.416
Indeno(1,2,3-cd)pyrene	0.258

SLF-TW16	
SVOC	
bis(2-Ethylhexyl)phthalate	ND
2-Methylnaphthalene	33.9
Naphthalene	6.6
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenzo(a,h)anthracene	ND
Indeno(1,2,3-cd)pyrene	ND

SLF-TW-18	
SVOC	
bis(2-Ethylhexyl)phthalate	ND
2-Methylnaphthalene	42.7
Naphthalene	45.3
Benzo(a)anthracene	0.134
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(k)fluoranthene	ND
Chrysene	0.22
Dibenzo(a,h)anthracene	ND
Indeno(1,2,3-cd)pyrene	ND

SLF-TW-17	
SVOC	
bis(2-Ethylhexyl)phthalate	ND
2-Methylnaphthalene	24.6
Naphthalene	23.7
Benzo(a)anthracene	0.199
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(k)fluoranthene	ND
Chrysene	0.317
Dibenzo(a,h)anthracene	ND
Indeno(1,2,3-cd)pyrene	ND

SLF-TW-21	
SVOC	
bis(2-Ethylhexyl)phthalate	11.3
2-Methylnaphthalene	725
Naphthalene	219
Benzo(a)anthracene	2.9
Benzo(a)pyrene	2.33
Benzo(b)fluoranthene	1.99
Benzo(k)fluoranthene	1.16
Chrysene	4.71
Dibenzo(a,h)anthracene	0.72
Indeno(1,2,3-cd)pyrene	0.422

SLF-TW-32	
SVOC	
bis(2-Ethylhexyl)phthalate	4.3
2-Methylnaphthalene	200
Naphthalene	-
Benzo(a)anthracene	1.42
Benzo(a)pyrene	0.593
Benzo(b)fluoranthene	0.539
Benzo(k)fluoranthene	0.388
Chrysene	2.93
Dibenzo(a,h)anthracene	0.133
Indeno(1,2,3-cd)pyrene	0.251

SLF-TW-31	
SVOC	
bis(2-Ethylhexyl)phthalate	23.6
2-Methylnaphthalene	241
Naphthalene	83.8
Benzo(a)anthracene	4.07
Benzo(a)pyrene	3.54
Benzo(b)fluoranthene	3.56
Benzo(k)fluoranthene	2.32
Chrysene	-
Dibenzo(a,h)anthracene	0.55
Indeno(1,2,3-cd)pyrene	1.31

SLF-TW-23	
SVOC	
bis(2-Ethylhexyl)phthalate	1.4 J
2-Methylnaphthalene	23.7
Naphthalene	66.6
Benzo(a)anthracene	0.316
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(k)fluoranthene	ND
Chrysene	0.58
Dibenzo(a,h)anthracene	ND
Indeno(1,2,3-cd)pyrene	ND

SLF-TW-22	
SVOC	
bis(2-Ethylhexyl)phthalate	ND
2-Methylnaphthalene	43.9
Naphthalene	231
Benzo(a)anthracene	0.704
Benzo(a)pyrene	0.41
Benzo(b)fluoranthene	0.251
Benzo(k)fluoranthene	0.0936 J
Chrysene	0.781
Dibenzo(a,h)anthracene	ND
Indeno(1,2,3-cd)pyrene	ND

SLF-TW-20	
SVOC	
bis(2-Ethylhexyl)phthalate	ND
2-Methylnaphthalene	1
Naphthalene	12.5
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenzo(a,h)anthracene	ND
Indeno(1,2,3-cd)pyrene	ND

SLF-TW-19	
SVOC	
bis(2-Ethylhexyl)phthalate	1.8 J
2-Methylnaphthalene	614
Naphthalene	286
Benzo(a)anthracene	2.19
Benzo(a)pyrene	2.16
Benzo(b)fluoranthene	0.958
Benzo(k)fluoranthene	1.53
Chrysene	2.74
Dibenzo(a,h)anthracene	0.44
Indeno(1,2,3-cd)pyrene	0.335

LEGEND

Temporary Well

NJ Groundwater Quality	
bis(2-Ethylhexyl)phthalate	3
2-Methylnaphthalene	30
Naphthalene	300
Benzo(a)anthracene	0.1
Benzo(a)pyrene	0.1
Benzo(b)fluoranthene	0.2
Benzo(k)fluoranthene	0.5
Chrysene	5
Dibenzo(a,h)anthracene	0.3
Indeno(1,2,3-cd)pyrene	0.2

NOTES:
1. Results provided in parts per billion (ug/L)

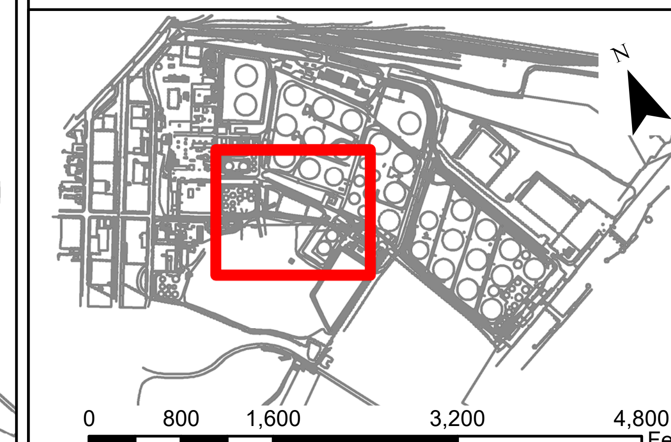

FIGURE: 7c
Temporary Well Analytical
September 2010
SVOC Results

HESS CORPORATION
FORMER PORT READING COMPLEX
750 CLIFF ROAD
PORT READING, NEW JERSEY

Project #:	1114J01.22	Date:	07/25/2022
SRP PI#:	006148	Drawn By:	RC

Earth Systems
Environmental Engineering
1625 Highway 71, Belmar, NJ 07719
T. 732.739.6444

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Source: NAD 1983 (2011) New Jersey State Plane FIPS 2900 US FT.

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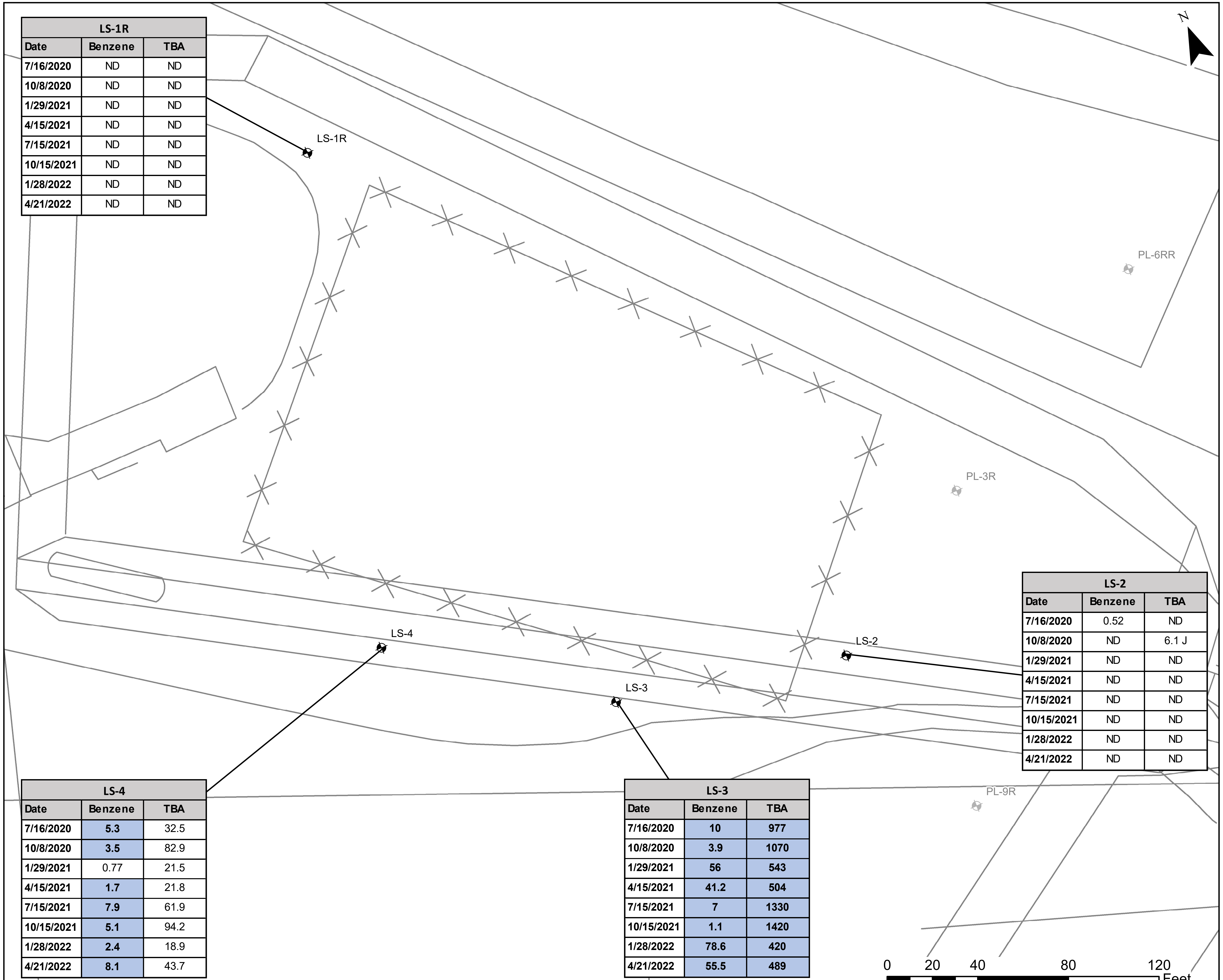

LS-1R		
Date	Benzene	TBA
7/16/2020	ND	ND
10/8/2020	ND	ND
1/29/2021	ND	ND
4/15/2021	ND	ND
7/15/2021	ND	ND
10/15/2021	ND	ND
1/28/2022	ND	ND
4/21/2022	ND	ND

LS-2		
Date	Benzene	TBA
7/16/2020	0.52	ND
10/8/2020	ND	6.1 J
1/29/2021	ND	ND
4/15/2021	ND	ND
7/15/2021	ND	ND
10/15/2021	ND	ND
1/28/2022	ND	ND
4/21/2022	ND	ND

LS-4		
Date	Benzene	TBA
7/16/2020	5.3	32.5
10/8/2020	3.5	82.9
1/29/2021	0.77	21.5
4/15/2021	1.7	21.8
7/15/2021	7.9	61.9
10/15/2021	5.1	94.2
1/28/2022	2.4	18.9
4/21/2022	8.1	43.7

LS-3		
Date	Benzene	TBA
7/16/2020	10	977
10/8/2020	3.9	1070
1/29/2021	56	543
4/15/2021	41.2	504
7/15/2021	7	1330
10/15/2021	1.1	1420
1/28/2022	78.6	420
4/21/2022	55.5	489

LEGEND

Monitoring Well

South Landfarm Monitoring Well

NJ Groundwater Quality (ug/L)	
Benzene	1
TBA	100

NOTES:
1. Data provided in ug/L (ppb).
2. Data from last 8 quarterly sampling events.

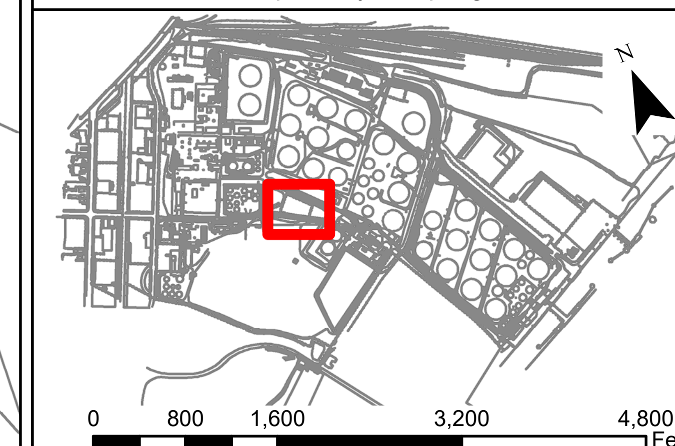

FIGURE: 8a

South Landfarm
Groundwater Analytical Results
VOCs

HESS CORPORATION
FORMER PORT READING COMPLEX
750 CLIFF ROAD
PORT READING, NEW JERSEY

Project #:	1114J01.22	**Date:**	08/01/2022
SRP PI#:	006148	**Drawn By:**	RC

Earth Systems
Environmental Engineering
1625 Highway 71, Belmar, NJ 07719
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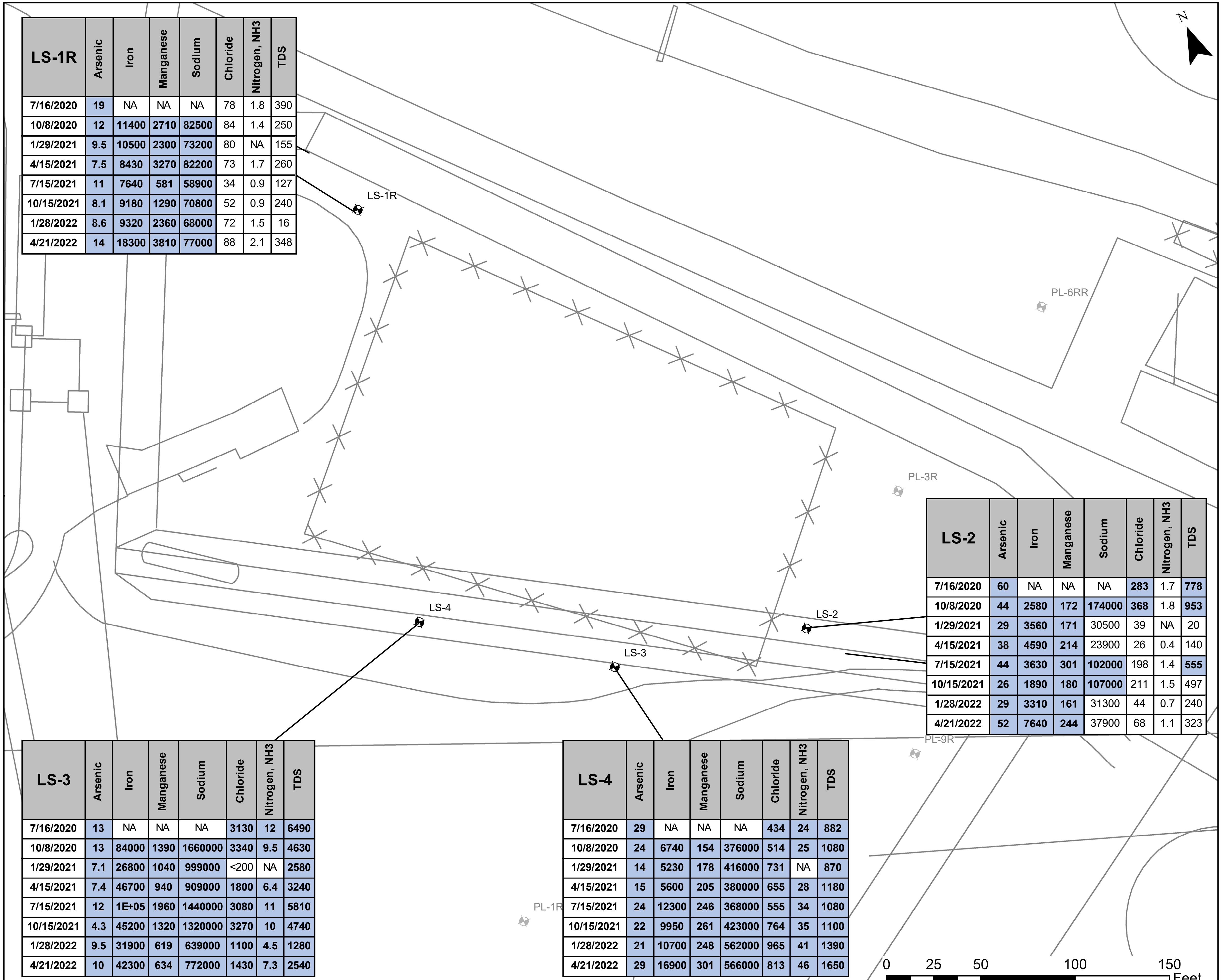
Document Path: A:\HESS Projects\1114J00 - Port Reading Hess\1114J01 - Sitewide\GIS_mxd\Oily Lagoon RIW\Oily Lagoon - Monitoring Well Historic Results - VOCs.mxd

Document Path: A:\HESS Projects\6491J01 - Former Doremus Terminal (T025)\GIS\Oily Lagoon - Monitoring Well Historic Results - Metals.mxd



LS-1R	Arsenic	Iron	Manganese	Sodium	Chloride	Nitrogen, NH3	TDS
7/16/2020	19	NA	NA	NA	78	1.8	390
10/8/2020	12	11400	2710	82500	84	1.4	250
1/29/2021	9.5	10500	2300	73200	80	NA	155
4/15/2021	7.5	8430	3270	82200	73	1.7	260
7/15/2021	11	7640	581	58900	34	0.9	127
10/15/2021	8.1	9180	1290	70800	52	0.9	240
1/28/2022	8.6	9320	2360	68000	72	1.5	16
4/21/2022	14	18300	3810	77000	88	2.1	348

LS-2	Arsenic	Iron	Manganese	Sodium	Chloride	Nitrogen, NH3	TDS
7/16/2020	60	NA	NA	NA	283	1.7	778
10/8/2020	44	2580	172	174000	368	1.8	953
1/29/2021	29	3560	171	30500	39	NA	20
4/15/2021	38	4590	214	23900	26	0.4	140
7/15/2021	44	3630	301	102000	198	1.4	555
10/15/2021	26	1890	180	107000	211	1.5	497
1/28/2022	29	3310	161	31300	44	0.7	240
4/21/2022	52	7640	244	37900	68	1.1	323

LS-3	Arsenic	Iron	Manganese	Sodium	Chloride	Nitrogen, NH3	TDS
7/16/2020	13	NA	NA	NA	3130	12	6490
10/8/2020	13	84000	1390	1660000	3340	9.5	4630
1/29/2021	7.1	26800	1040	999000	<200	NA	2580
4/15/2021	7.4	46700	940	909000	1800	6.4	3240
7/15/2021	12	1E+05	1960	1440000	3080	11	5810
10/15/2021	4.3	45200	1320	1320000	3270	10	4740
1/28/2022	9.5	31900	619	639000	1100	4.5	1280
4/21/2022	10	42300	634	772000	1430	7.3	2540

LS-4	Arsenic	Iron	Manganese	Sodium	Chloride	Nitrogen, NH3	TDS
7/16/2020	29	NA	NA	NA	434	24	882
10/8/2020	24	6740	154	376000	514	25	1080
1/29/2021	14	5230	178	416000	731	NA	870
4/15/2021	15	5600	205	380000	655	28	1180
7/15/2021	24	12300	246	368000	555	34	1080
10/15/2021	22	9950	261	423000	764	35	1100
1/28/2022	21	10700	248	562000	965	41	1390
4/21/2022	29	16900	301	566000	813	46	1650

LEGEND

Monitoring Well

South Landfarm Monitoring

Compound	Units	GWQS
Arsenic	ppb	3
Iron	ppb	300
Manganese	ppb	50
Sodium	ppb	50000
Chloride	ppm	250
Nitrogen, Ammonia	ppm	3
Solids, Total Dissolved	ppm	500

NOTES:
1. Data provided in ug/L (ppb).
2. Data from last 8 quarterly sampling events.

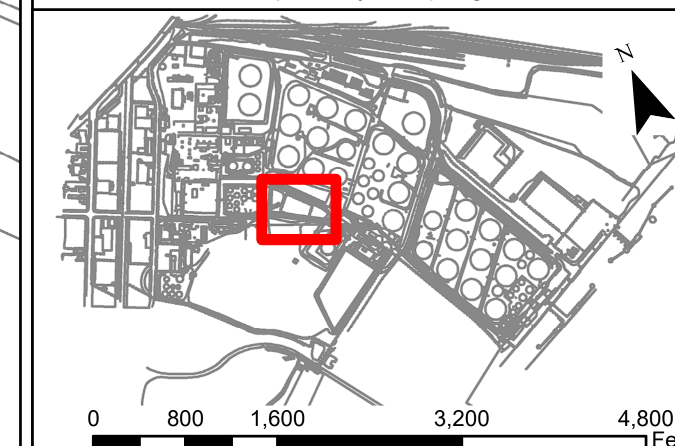


FIGURE: 8b
South Landfarm
Groundwater Analytical Results
Metals

HESS CORPORATION
FORMER PORT READING COMPLEX
750 CLIFF ROAD
PORT READING, NEW JERSEY

Project #:	1114J01.22	**Date:**	08/01/2022
SRP PI#:	006148	**Drawn By:**	RC

Earth Systems
Environmental Engineering

1625 Highway 71, Belmar, NJ 07719
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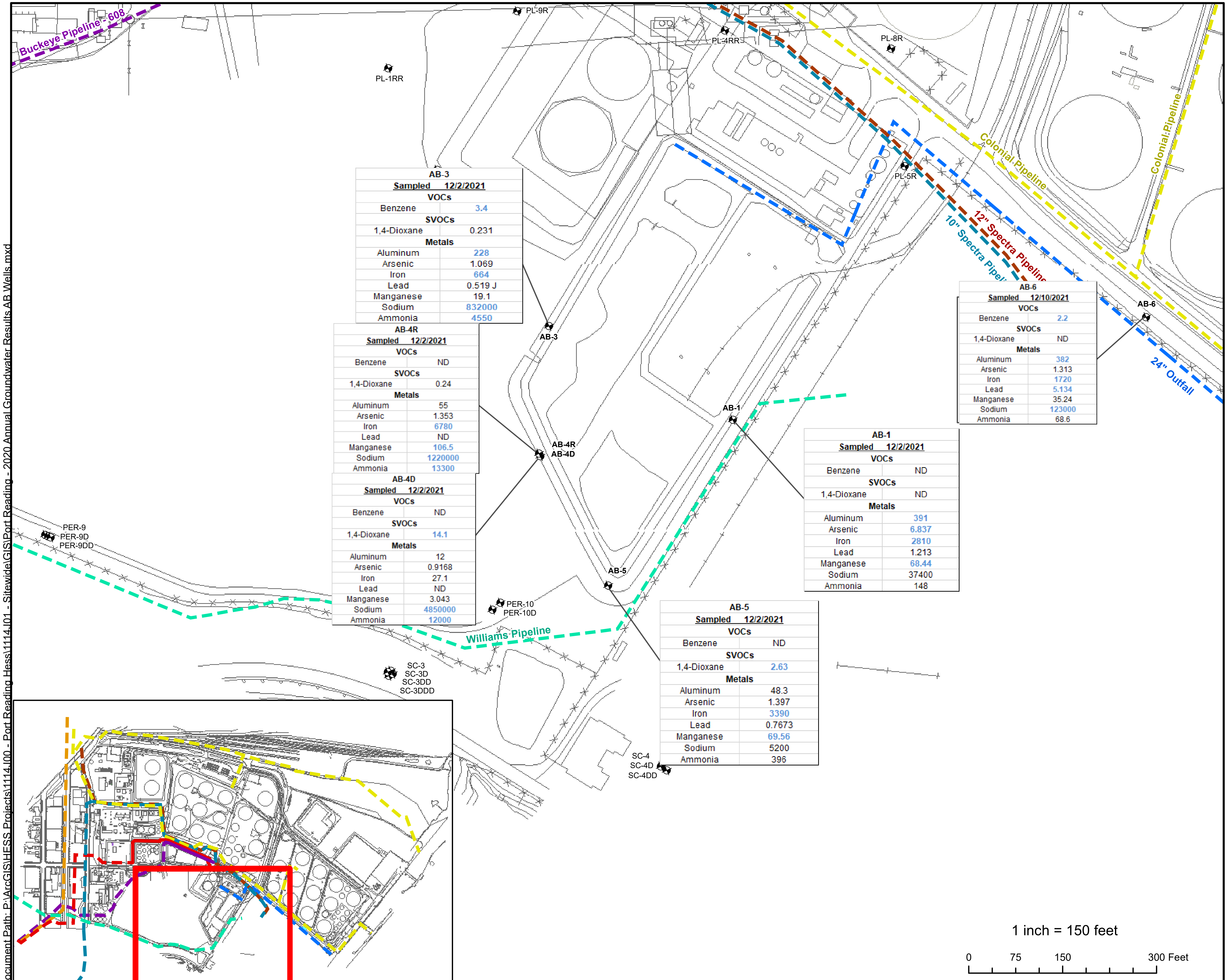
Maps and Figures that are not signed and sealed are not considered engineering work products and are approximate representations of field conditions.



AB-3	
Sampled	**12/2/2021**
VOCs	
Benzene	3.4
SVOCs	
1,4-Dioxane	0.231
Metals	
Aluminum	228
Arsenic	1.069
Iron	664
Lead	0.519 J
Manganese	19.1
Sodium	832000
Ammonia	4550

AB-4R	
Sampled	**12/2/2021**
VOCs	
Benzene	ND
SVOCs	
1,4-Dioxane	0.24
Metals	
Aluminum	55
Arsenic	1.353
Iron	6780
Lead	ND
Manganese	106.5
Sodium	1220000
Ammonia	13300

AB-4D	
Sampled	**12/2/2021**
VOCs	
Benzene	ND
SVOCs	
1,4-Dioxane	14.1
Metals	
Aluminum	12
Arsenic	0.9168
Iron	27.1
Lead	ND
Manganese	3.043
Sodium	4850000
Ammonia	12000

AB-6	
Sampled	**12/10/2021**
VOCs	
Benzene	2.2
SVOCs	
1,4-Dioxane	ND
Metals	
Aluminum	382
Arsenic	1.313
Iron	1720
Lead	5.134
Manganese	35.24
Sodium	123000
Ammonia	68.6

AB-1	
Sampled	**12/2/2021**
VOCs	
Benzene	ND
SVOCs	
1,4-Dioxane	ND
Metals	
Aluminum	391
Arsenic	6.837
Iron	2810
Lead	1.213
Manganese	68.44
Sodium	37400
Ammonia	148

AB-5	
Sampled	**12/2/2021**
VOCs	
Benzene	ND
SVOCs	
1,4-Dioxane	2.63
Metals	
Aluminum	48.3
Arsenic	1.397
Iron	3390
Lead	0.7673
Manganese	69.56
Sodium	5200
Ammonia	396

LEGEND

N

Monitoring Well

NJ Groundwater Criteria	
VOCs	
Benzene	1
SVOCs	
1,4-Dioxane	0.4
Metals	
Aluminum	200
Arsenic	3
Iron	300
Lead	5
Manganese	50
Sodium, Total	50000
Nitrogen, Ammonia	3000

NOTE:
1. All results measured in ug/l

FIGURE: 9
Aeration Basins 2021 Annual Groundwater Sampling Results

HESS CORPORATION
FORMER PORT READING COMPLEX
750 CLIFF ROAD
PORT READING, NEW JERSEY

Project #:	1114J01	**Drawn:**	1/21/2022
SRP PI#:	006148	**Drawn By:**	JP

Earth Systems
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1625 Highway 71, Belmar, NJ 07719
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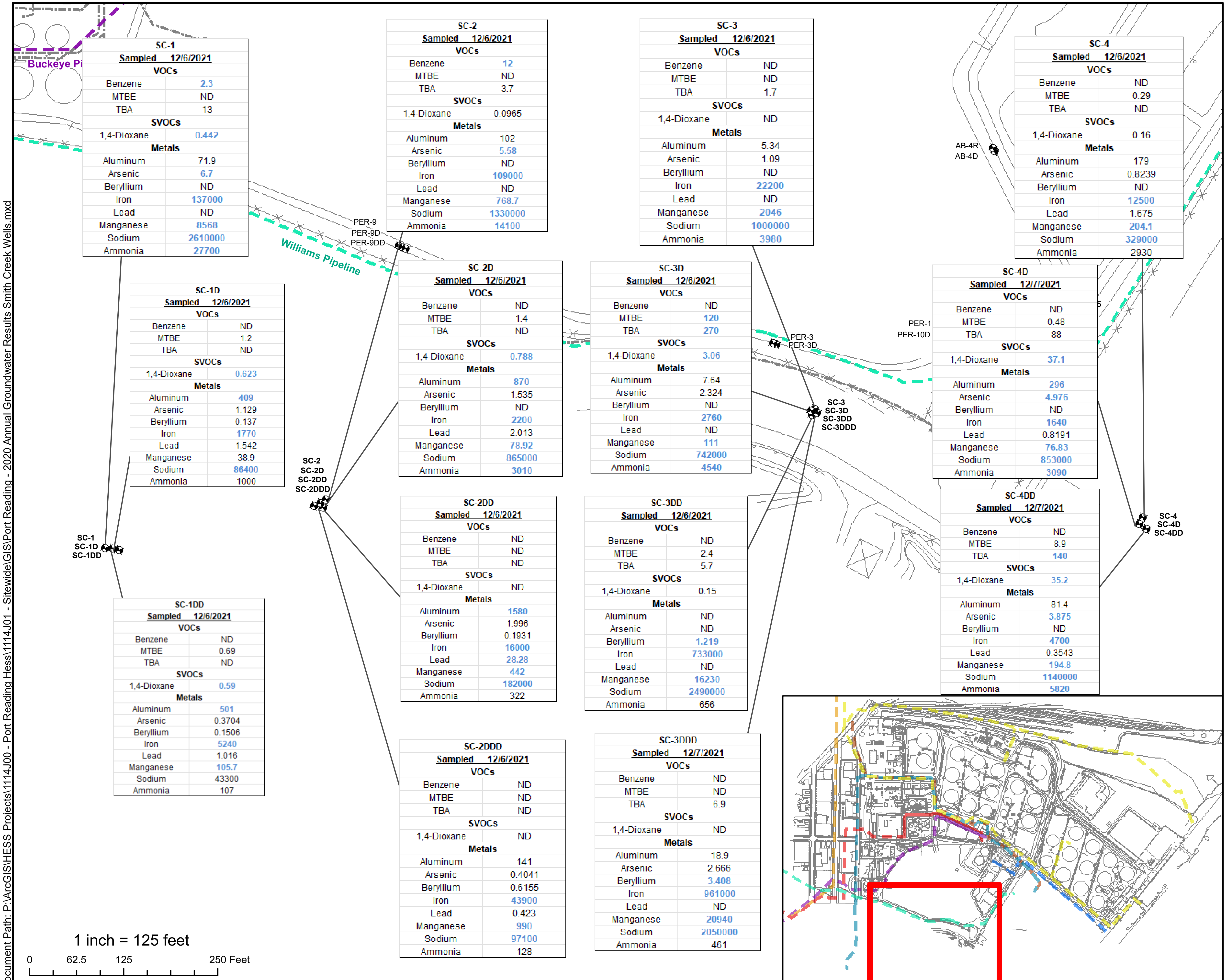

SC-1	
Sampled	12/6/2021
VOCs	
Benzene	2.3
MTBE	ND
TBA	13
SVOCs	
1,4-Dioxane	0.442
Metals	
Aluminum	71.9
Arsenic	6.7
Beryllium	ND
Iron	137000
Lead	ND
Manganese	8568
Sodium	2610000
Ammonia	27700

SC-1D	
Sampled	12/6/2021
VOCs	
Benzene	ND
MTBE	1.2
TBA	ND
SVOCs	
1,4-Dioxane	0.623
Metals	
Aluminum	409
Arsenic	1.129
Beryllium	0.137
Iron	1770
Lead	1.542
Manganese	38.9
Sodium	86400
Ammonia	1000

SC-1DD	
Sampled	12/6/2021
VOCs	
Benzene	ND
MTBE	0.69
TBA	ND
SVOCs	
1,4-Dioxane	0.59
Metals	
Aluminum	501
Arsenic	0.3704
Beryllium	0.1506
Iron	5240
Lead	1.016
Manganese	105.7
Sodium	43300
Ammonia	107

SC-2	
Sampled	12/6/2021
VOCs	
Benzene	12
MTBE	ND
TBA	3.7
SVOCs	
1,4-Dioxane	0.0965
Metals	
Aluminum	102
Arsenic	5.58
Beryllium	ND
Iron	109000
Lead	ND
Manganese	768.7
Sodium	1330000
Ammonia	14100

SC-2D	
Sampled	12/6/2021
VOCs	
Benzene	ND
MTBE	1.4
TBA	ND
SVOCs	
1,4-Dioxane	0.788
Metals	
Aluminum	870
Arsenic	1.535
Beryllium	ND
Iron	2200
Lead	2.013
Manganese	78.92
Sodium	865000
Ammonia	3010

SC-2DD	
Sampled	12/6/2021
VOCs	
Benzene	ND
MTBE	ND
TBA	ND
SVOCs	
1,4-Dioxane	ND
Metals	
Aluminum	1580
Arsenic	1.996
Beryllium	0.1931
Iron	16000
Lead	28.28
Manganese	442
Sodium	182000
Ammonia	322

SC-2DDD	
Sampled	12/6/2021
VOCs	
Benzene	ND
MTBE	ND
TBA	ND
SVOCs	
1,4-Dioxane	ND
Metals	
Aluminum	141
Arsenic	0.4041
Beryllium	0.6155
Iron	43900
Lead	0.423
Manganese	990
Sodium	97100
Ammonia	128

SC-3	
Sampled	12/6/2021
VOCs	
Benzene	ND
MTBE	ND
TBA	1.7
SVOCs	
1,4-Dioxane	ND
Metals	
Aluminum	5.34
Arsenic	1.09
Beryllium	ND
Iron	22200
Lead	ND
Manganese	2046
Sodium	1000000
Ammonia	3980

SC-3D	
Sampled	12/6/2021
VOCs	
Benzene	ND
MTBE	120
TBA	270
SVOCs	
1,4-Dioxane	3.06
Metals	
Aluminum	7.64
Arsenic	2.324
Beryllium	ND
Iron	2760
Lead	ND
Manganese	111
Sodium	742000
Ammonia	4540

SC-3DD	
Sampled	12/6/2021
VOCs	
Benzene	ND
MTBE	2.4
TBA	5.7
SVOCs	
1,4-Dioxane	0.15
Metals	
Aluminum	ND
Arsenic	ND
Beryllium	1.219
Iron	733000
Lead	ND
Manganese	16230
Sodium	2490000
Ammonia	656

SC-3DDD	
Sampled	12/7/2021
VOCs	
Benzene	ND
MTBE	ND
TBA	6.9
SVOCs	
1,4-Dioxane	ND
Metals	
Aluminum	18.9
Arsenic	2.666
Beryllium	3.408
Iron	961000
Lead	ND
Manganese	20940
Sodium	2050000
Ammonia	461

SC-4	
Sampled	12/6/2021
VOCs	
Benzene	ND
MTBE	0.29
TBA	ND
SVOCs	
1,4-Dioxane	0.16
Metals	
Aluminum	179
Arsenic	0.8239
Beryllium	ND
Iron	12500
Lead	1.675
Manganese	204.1
Sodium	329000
Ammonia	2930

SC-4D	
Sampled	12/7/2021
VOCs	
Benzene	ND
MTBE	0.48
TBA	88
SVOCs	
1,4-Dioxane	37.1
Metals	
Aluminum	296
Arsenic	4.976
Beryllium	ND
Iron	1640
Lead	0.8191
Manganese	76.83
Sodium	853000
Ammonia	3090

SC-4DD	
Sampled	12/7/2021
VOCs	
Benzene	ND
MTBE	8.9
TBA	140
SVOCs	
1,4-Dioxane	35.2
Metals	
Aluminum	81.4
Arsenic	3.875
Beryllium	ND
Iron	4700
Lead	0.3543
Manganese	194.8
Sodium	1140000
Ammonia	5820

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LEGEND

N

Monitoring Well

NJ Groundwater Criteria	
VOCs	
Benzene	1
MTBE	70
TBA	100
SVOCs	
1,4-Dioxane	0.4
Metals	
Aluminum	200
Arsenic	3
Beryllium	1
Iron	300
Lead	5
Manganese	50
Sodium	50000
Ammonia	3000

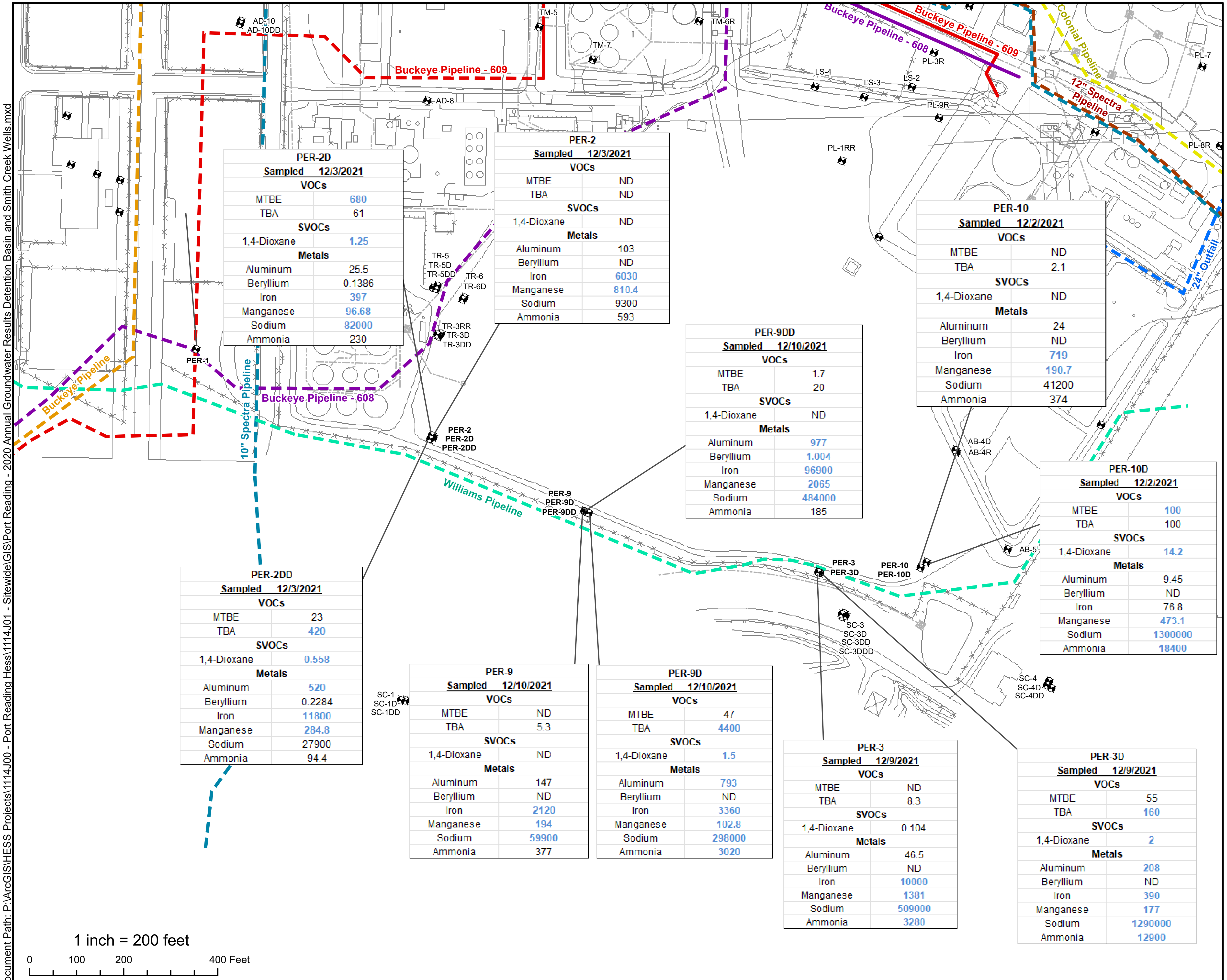
NOTE:
1. All results were measured in ug/l

FIGURE: 10
PSEG Offiste Wells
2021 Annual Groundwater Sampling Results

HESS CORPORATION
FORMER PORT READING COMPLEX
750 CLIFF ROAD
PORT READING, NEW JERSEY

Project #:	1114J01	Drawn:	1/17/2021
SRP PI#:	006148	Drawn By:	AB

Earth Systems
Environmental Engineering
1625 Highway 71, Belmar, NJ 07719
T. 732.739.6444 | F. 732.739.0451



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PER-2D — Sampled 12/3/2021

VOCs	
MTBE	680
TBA	61
SVOCs	
1,4-Dioxane	1.25
Metals	
Aluminum	25.5
Beryllium	0.1386
Iron	397
Manganese	96.68
Sodium	82000
Ammonia	230

PER-2 — Sampled 12/3/2021

VOCs	
MTBE	ND
TBA	ND
SVOCs	
1,4-Dioxane	ND
Metals	
Aluminum	103
Beryllium	ND
Iron	6030
Manganese	810.4
Sodium	9300
Ammonia	593

PER-10 — Sampled 12/2/2021

VOCs	
MTBE	ND
TBA	2.1
SVOCs	
1,4-Dioxane	ND
Metals	
Aluminum	24
Beryllium	ND
Iron	719
Manganese	190.7
Sodium	41200
Ammonia	374

PER-9DD — Sampled 12/10/2021

VOCs	
MTBE	1.7
TBA	20
SVOCs	
1,4-Dioxane	ND
Metals	
Aluminum	977
Beryllium	1.004
Iron	96900
Manganese	2065
Sodium	484000
Ammonia	185

PER-10D — Sampled 12/2/2021

VOCs	
MTBE	100
TBA	100
SVOCs	
1,4-Dioxane	14.2
Metals	
Aluminum	9.45
Beryllium	ND
Iron	76.8
Manganese	473.1
Sodium	1300000
Ammonia	18400

PER-2DD — Sampled 12/3/2021

VOCs	
MTBE	23
TBA	420
SVOCs	
1,4-Dioxane	0.558
Metals	
Aluminum	520
Beryllium	0.2284
Iron	11800
Manganese	284.8
Sodium	27900
Ammonia	94.4

PER-9 — Sampled 12/10/2021

VOCs	
MTBE	ND
TBA	5.3
SVOCs	
1,4-Dioxane	ND
Metals	
Aluminum	147
Beryllium	ND
Iron	2120
Manganese	194
Sodium	59900
Ammonia	377

PER-9D — Sampled 12/10/2021

VOCs	
MTBE	47
TBA	4400
SVOCs	
1,4-Dioxane	1.5
Metals	
Aluminum	793
Beryllium	ND
Iron	3360
Manganese	102.8
Sodium	298000
Ammonia	3020

PER-3 — Sampled 12/9/2021

VOCs	
MTBE	ND
TBA	8.3
SVOCs	
1,4-Dioxane	0.104
Metals	
Aluminum	46.5
Beryllium	ND
Iron	10000
Manganese	1381
Sodium	509000
Ammonia	3280

PER-3D — Sampled 12/9/2021

VOCs	
MTBE	55
TBA	160
SVOCs	
1,4-Dioxane	2
Metals	
Aluminum	208
Beryllium	ND
Iron	390
Manganese	177
Sodium	1290000
Ammonia	12900

LEGEND

Monitoring Well

N

NJ Groundwater Criteria

VOCs	
MTBE	70
TBA	100
SVOCs	
1,4-Dioxane	0.4
Metals	
Aluminum	200
Beryllium	1
Iron	300
Manganese	50
Sodium	50000
Ammonia	3000

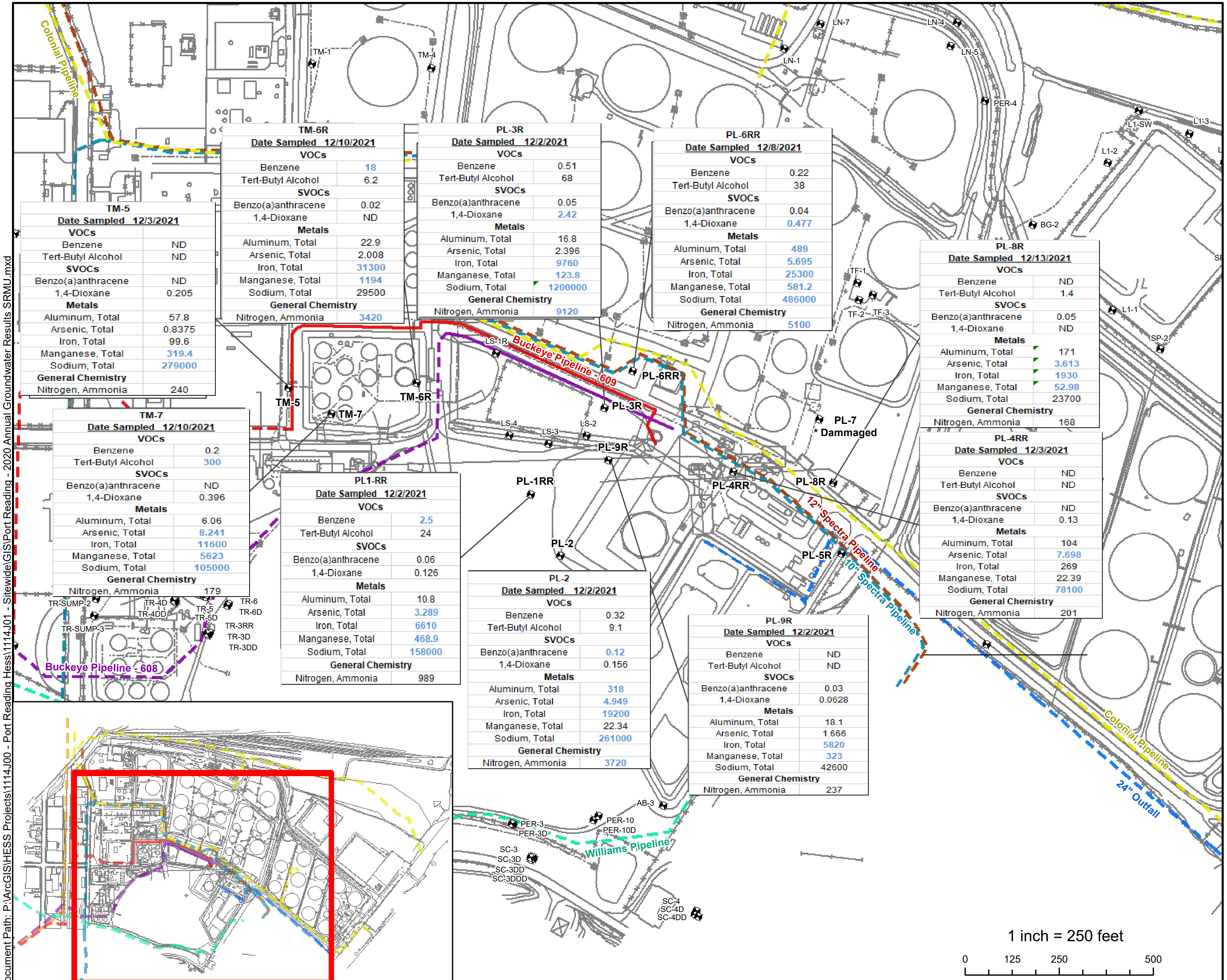
NOTE:
1. All results were measured in ug/l

FIGURE: 11
Detention Basin 2021 Annual Groundwater Sampling Results

HESS CORPORATION
FORMER PORT READING COMPLEX
750 CLIFF ROAD
PORT READING, NEW JERSEY

Project #:	1114J01	**Drawn:**	1/17/2021
SRP PI#:	006148	**Drawn By:**	AB

Earth Systems
Environmental Engineering
1625 Highway 71, Belmar, NJ 07719
T. 732.739.6444 | F. 732.739.0451



TM-6R	
Date Sampled	12/10/2021
VOCs	
Benzene	18
Tert-Butyl Alcohol	6.2
SVOCs	
Benzo(a)anthracene	0.02
1,4-Dioxane	ND
Metals	
Aluminum, Total	22.9
Arsenic, Total	2.008
Iron, Total	31300
Manganese, Total	1194
Sodium, Total	29500
General Chemistry	
Nitrogen, Ammonia	3420

PL-3R	
Date Sampled	12/2/2021
VOCs	
Benzene	0.51
Tert-Butyl Alcohol	68
SVOCs	
Benzo(a)anthracene	0.05
1,4-Dioxane	2.42
Metals	
Aluminum, Total	16.8
Arsenic, Total	2.396
Iron, Total	9760
Manganese, Total	123.8
Sodium, Total	1200000
General Chemistry	
Nitrogen, Ammonia	9120

PL-6RR	
Date Sampled	12/8/2021
VOCs	
Benzene	0.22
Tert-Butyl Alcohol	38
SVOCs	
Benzo(a)anthracene	0.04
1,4-Dioxane	0.477
Metals	
Aluminum, Total	489
Arsenic, Total	5.695
Iron, Total	25300
Manganese, Total	581.2
Sodium, Total	486000
General Chemistry	
Nitrogen, Ammonia	5100

TM-5	
Date Sampled	12/3/2021
VOCs	
Benzene	ND
Tert-Butyl Alcohol	ND
SVOCs	
Benzo(a)anthracene	ND
1,4-Dioxane	0.205
Metals	
Aluminum, Total	57.8
Arsenic, Total	0.8375
Iron, Total	99.6
Manganese, Total	319.4
Sodium, Total	279000
General Chemistry	
Nitrogen, Ammonia	240

TM-7	
Date Sampled	12/10/2021
VOCs	
Benzene	0.2
Tert-Butyl Alcohol	300
SVOCs	
Benzo(a)anthracene	ND
1,4-Dioxane	0.396
Metals	
Aluminum, Total	6.06
Arsenic, Total	8.241
Iron, Total	11600
Manganese, Total	5623
Sodium, Total	105000
General Chemistry	
Nitrogen, Ammonia	179

PL1-RR	
Date Sampled	12/2/2021
VOCs	
Benzene	2.5
Tert-Butyl Alcohol	24
SVOCs	
Benzo(a)anthracene	0.06
1,4-Dioxane	0.126
Metals	
Aluminum, Total	10.8
Arsenic, Total	3.289
Iron, Total	6610
Manganese, Total	468.9
Sodium, Total	158000
General Chemistry	
Nitrogen, Ammonia	989

PL-2	
Date Sampled	12/2/2021
VOCs	
Benzene	0.32
Tert-Butyl Alcohol	9.1
SVOCs	
Benzo(a)anthracene	0.12
1,4-Dioxane	0.156
Metals	
Aluminum, Total	318
Arsenic, Total	4.949
Iron, Total	19200
Manganese, Total	22.34
Sodium, Total	261000
General Chemistry	
Nitrogen, Ammonia	3720

PL-9R	
Date Sampled	12/2/2021
VOCs	
Benzene	ND
Tert-Butyl Alcohol	ND
SVOCs	
Benzo(a)anthracene	0.03
1,4-Dioxane	0.0628
Metals	
Aluminum, Total	18.1
Arsenic, Total	1.666
Iron, Total	5820
Manganese, Total	323
Sodium, Total	42600
General Chemistry	
Nitrogen, Ammonia	237

PL-8R	
Date Sampled	12/13/2021
VOCs	
Benzene	ND
Tert-Butyl Alcohol	1.4
SVOCs	
Benzo(a)anthracene	0.05
1,4-Dioxane	ND
Metals	
Aluminum, Total	171
Arsenic, Total	3.613
Iron, Total	1930
Manganese, Total	52.98
Sodium, Total	23700
General Chemistry	
Nitrogen, Ammonia	168

PL-4RR	
Date Sampled	12/3/2021
VOCs	
Benzene	ND
Tert-Butyl Alcohol	ND
SVOCs	
Benzo(a)anthracene	ND
1,4-Dioxane	0.13
Metals	
Aluminum, Total	104
Arsenic, Total	7.698
Iron, Total	269
Manganese, Total	22.39
Sodium, Total	78100
General Chemistry	
Nitrogen, Ammonia	201

LEGEND

Monitoring Well

NJ Ground Water Criteria	
VOCs	
Benzene	1
Tert-Butyl Alcohol	100
SVOCs	
Benzo(a)anthracene	0.1
1,4-Dioxane	0.4
Metals	
Aluminum, Total	200
Arsenic, Total	3
Iron, Total	300
Manganese, Total	50
Sodium, Total	50000
General Chemistry	
Nitrogen, Ammonia	3000

NOTE:
1. All Results were Measured in ug/l
2. PL-7 and PL-5RR were not sampled during this event

FIGURE: 12
SRMU
2021 Annual Groundwater Sampling Results

HESS CORPORATION
FORMER PORT READING COMPLEX
750 CLIFF ROAD
PORT READING, NEW JERSEY

Project #:	1114J01	Drawn:	1/26/2022
SRP PI#:	006148	Drawn By:	JP

Earth Systems
Environmental Engineering
1625 Highway 71, Belmar, NJ 07719
T. 732.739.6444 | F. 732.739.0451

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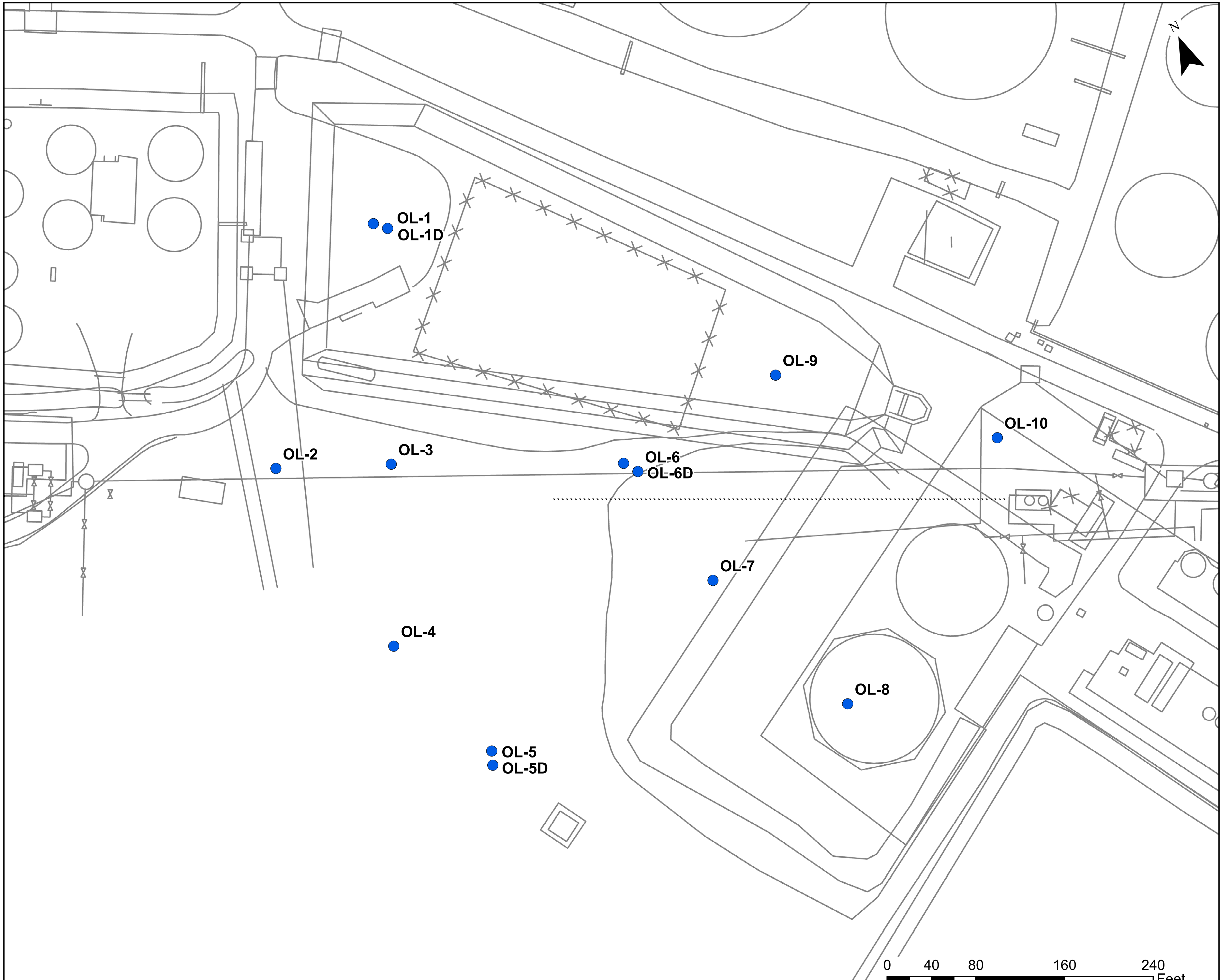
LEGEND

Proposed Monitoring Well Location



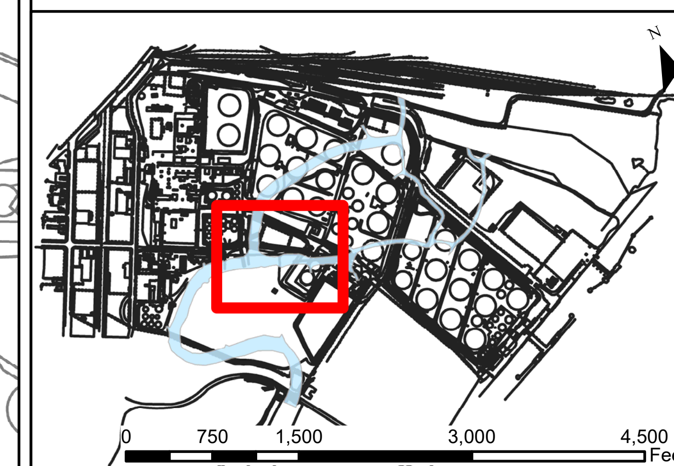


FIGURE: 13

Proposed Monitoring Well Locations

HESS CORPORATION
FORMER PORT READING TERMINAL
750 CLIFF ROAD
PORT READING, NEWJERSEY

Project #:	1114J01.22	**Date:**	08/04/2022
SRP PI#:	006148	**Drawn By:**	RC

Earth Systems
Environmental Engineering

1625 Highway 71, Belmar, NJ 07719
T. 732.739.6444

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Source: NAD 1983 (2011) New Jersey State Plane FIPS 2900 US FT.

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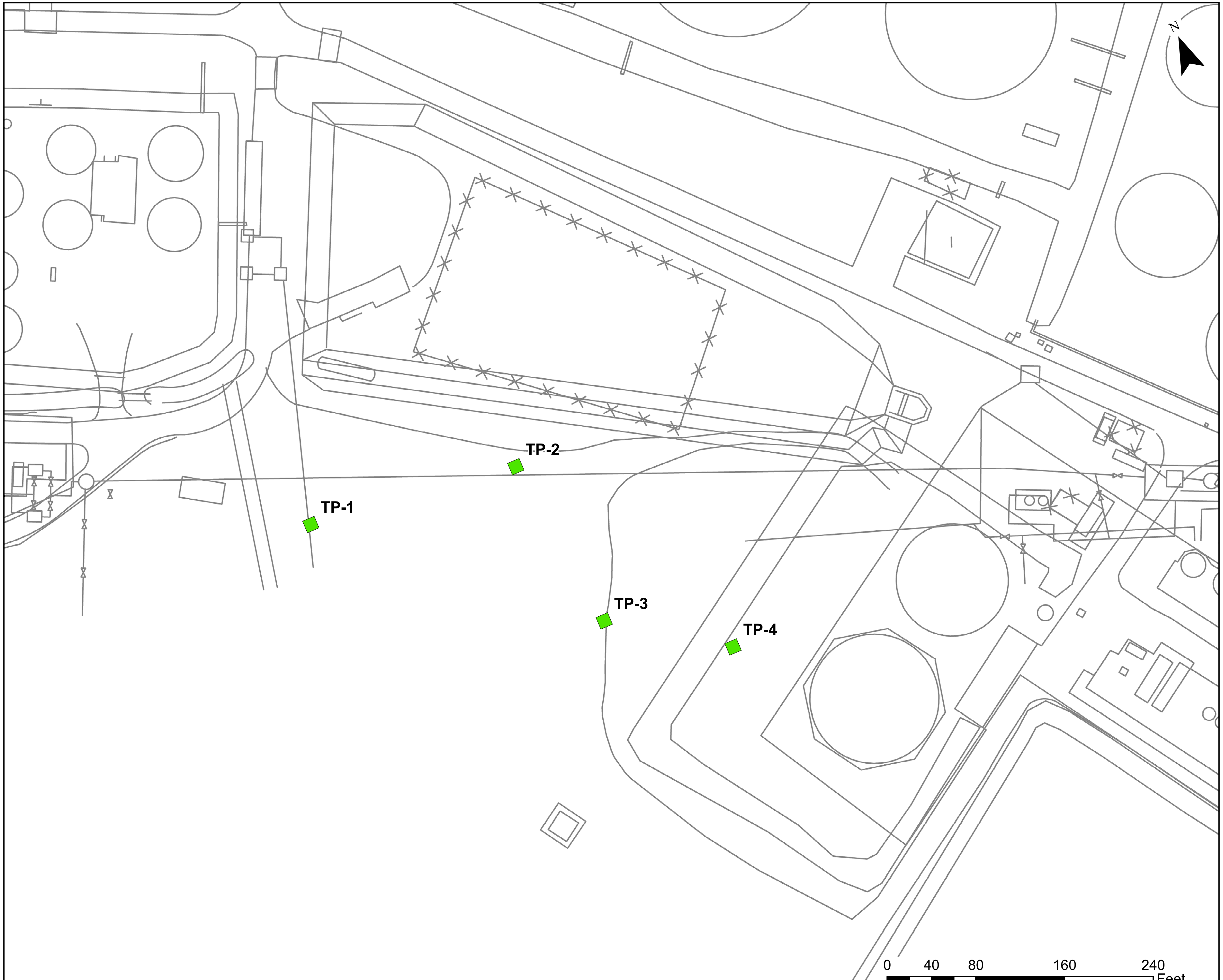
Maps and Figures that are not signed and sealed are not considered engineering work products and are approximate representions of field conditions.



LEGEND

Proposed Test Pit Location

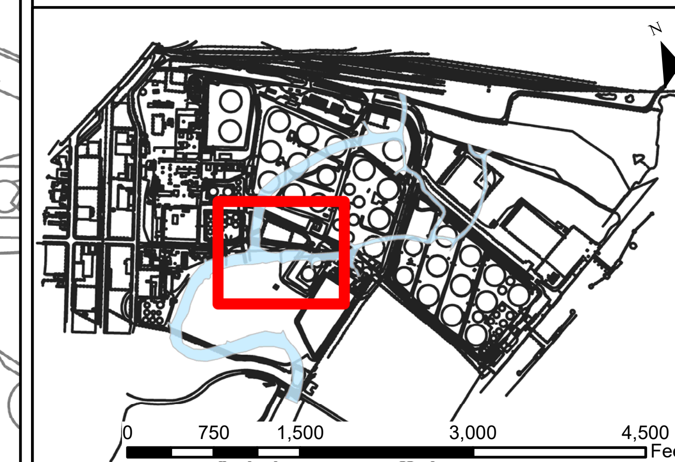


FIGURE: 14

Proposed Test Pit Locations

HESS CORPORATION
FORMER PORT READING TERMINAL
750 CLIFF ROAD
PORT READING, NEWJERSEY

Project #:	1114J01.22	**Date:**	08/04/2022
SRP PI#:	006148	**Drawn By:**	RC

Earth Systems
Environmental Engineering

1625 Highway 71, Belmar, NJ 07719
T. 732.739.6444

This map was developed using New Jersey Department of Environmental Protection Geographic Information System Digital Data, but this secondary product has not been verified by NJDEP and is not state authorized. Source: NAD 1983 (2011) New Jersey State Plane FIPS 2900 US FT.

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Maps and Figures that are not signed and sealed are not engineering work products and are approximate representions of field conditions.

TABLES

Table 1
Hess Corporation Former Port Reading Terminal
750 Cliff Road, Port Reading, New Jersey
AOC 13 - Former Oily Water Lagoons September 2013 Soil Analytical Results

Client Sample ID:		NJ Soil Remediation Standards Ingestion Dermal Exp. Pathway Residential	NJ Soil Remediation Standards Ingestion Dermal Exp. Pathway Non-Residential	NJ Soil Remediation Standards Inhalationl Exp. Pathway Residential	NJ Soil Remediation Standards Inhalationl Exp. Pathway Non-Residential	SBGRD-12 (11.5-12)	SBGRD-12 (19.5-20)	SBGRD-12 (29-29.5)	SBGRD-13 (13-13.5)	SBGRD-13 (24.5-25.0)	SBGRD-13 (29-29.5)
Lab Sample ID:						JB46851-1	JB46851-3	JB46851-5	JB47049-1	JB47049-3	JB47049-5
Date Sampled:						9/9/2013	9/9/2013	9/9/2013	9/10/2013	9/10/2013	9/10/2013
Matrix:						Soil	Soil	Soil	Soil	Soil	Soil
MS Volatiles (SW846 8260B)											
Acetone	mg/kg	70000	-	-	-	0.149	ND (0.0038)	ND (0.0021)	0.0744	0.0273	0.0279
Benzene	mg/kg	3	16	2.2	11	1.18	ND (0.00026)	ND (0.00015)	0.375	ND (0.00027)	ND (0.00023)
Bromochloromethane	mg/kg	-	-	-	-	ND (0.00045)	ND (0.00059)	ND (0.00032)	ND (0.00052)	ND (0.00059)	ND (0.00050)
Bromodichloromethane	mg/kg	11	59	-	-	ND (0.00018)	ND (0.00023)	ND (0.00013)	ND (0.00021)	ND (0.00023)	ND (0.00020)
Bromoform	mg/kg	88	460	-	-	ND (0.00025)	ND (0.00034)	ND (0.00018)	ND (0.00030)	ND (0.00034)	ND (0.00029)
Bromomethane	mg/kg	110	1800	18	82	ND (0.00046)	ND (0.00061)	ND (0.00033)	ND (0.00054)	ND (0.00061)	ND (0.00052)
2-Butanone (MEK)	mg/kg	47000	780000	-	-	0.0369	ND (0.0053)	ND (0.0029)	0.0083 J	ND (0.0053)	ND (0.0045)
Carbon disulfide	mg/kg	-	-	-	-	0.0024 J	0.0116	0.0177	0.0156	0.0251	0.0121
Carbon tetrachloride	mg/kg	7.6	40	1.4	6.9	ND (0.00022)	ND (0.00030)	ND (0.00016)	ND (0.00026)	ND (0.00030)	ND (0.00025)
Chlorobenzene	mg/kg	510	8400	-	-	0.0046 J	ND (0.00024)	ND (0.00013)	0.0052 J	ND (0.00024)	ND (0.00021)
Chloroethane	mg/kg	-	-	-	-	ND (0.00038)	ND (0.00050)	ND (0.00028)	ND (0.00045)	ND (0.00051)	ND (0.00043)
Chloroform	mg/kg	780	13000	590	-	ND (0.00014)	ND (0.00018)	ND (0.00010)	ND (0.00016)	ND (0.00018)	ND (0.00016)
Chloromethane	mg/kg	-	-	270	1200	ND (0.00031)	ND (0.00041)	ND (0.00023)	ND (0.00037)	ND (0.00042)	ND (0.00035)
Cyclohexane	mg/kg	-	-	-	-	0.244	ND (0.00028)	ND (0.00015)	0.117	ND (0.00028)	ND (0.00024)
1,2-Dibromo-3-chloropropane	mg/kg	0.87	4.5	0.026	0.12	ND (0.0015)	ND (0.0020)	ND (0.0011)	ND (0.0017)	ND (0.0020)	ND (0.0017)
Dibromochloromethane	mg/kg	8.3	43	-	-	ND (0.00028)	ND (0.00036)	ND (0.00020)	ND (0.00032)	ND (0.00037)	ND (0.00031)
1,2-Dibromoethane	mg/kg	0.35	1.8	0.085	0.41	ND (0.00021)	ND (0.00028)	ND (0.00016)	ND (0.00025)	ND (0.00028)	ND (0.00024)
1,2-Dichlorobenzene	mg/kg	6700	110000	-	-	0.0023 J	ND (0.00042)	ND (0.00023)	0.0051 J	ND (0.00042)	ND (0.00036)
1,3-Dichlorobenzene	mg/kg	6700	110000	-	-	0.0015 J	ND (0.00042)	ND (0.00023)	ND (0.00037)	ND (0.00042)	ND (0.00036)
1,4-Dichlorobenzene	mg/kg	780	13000	-	-	0.0030 J	ND (0.00039)	ND (0.00022)	ND (0.00035)	ND (0.00039)	ND (0.00033)
Dichlorodifluoromethane	mg/kg	16000	260000	-	-	ND (0.00038)	ND (0.00051)	ND (0.00028)	ND (0.00045)	ND (0.00051)	ND (0.00043)
1,1-Dichloroethane	mg/kg	120	640	-	-	ND (0.00023)	ND (0.00030)	0.00074 J	ND (0.00027)	ND (0.00031)	ND (0.00026)
1,2-Dichloroethane	mg/kg	5.8	30	71	320	ND (0.00023)	ND (0.00030)	ND (0.00017)	ND (0.00027)	ND (0.00030)	ND (0.00026)
1,1-Dichloroethene	mg/kg	11	180	52	240	ND (0.00043)	ND (0.00057)	0.0011 J	ND (0.00051)	ND (0.00057)	ND (0.00049)
cis-1,2-Dichloroethene	mg/kg	780	13000	-	-	ND (0.00031)	ND (0.00041)	0.0032 J	ND (0.00036)	ND (0.00041)	ND (0.00035)
trans-1,2-Dichloroethene	mg/kg	1300	22000	-	-	ND (0.00040)	ND (0.00053)	ND (0.00029)	ND (0.00047)	ND (0.00053)	ND (0.00045)
1,2-Dichloropropane	mg/kg	19	98	5.7	27	ND (0.00026)	ND (0.00034)	ND (0.00019)	ND (0.00030)	ND (0.00034)	ND (0.00029)
cis-1,3-Dichloropropene	mg/kg	7	36	4.8	23	ND (0.00023)	ND (0.00031)	ND (0.00017)	ND (0.00027)	ND (0.00031)	ND (0.00026)
trans-1,3-Dichloropropene	mg/kg	7	36	4.8	23	ND (0.00026)	ND (0.00034)	ND (0.00019)	ND (0.00030)	ND (0.00035)	ND (0.00029)
1,4-Dioxane	mg/kg	7	36	45	210	ND (0.10)	ND (0.13)	ND (0.073)	ND (0.12)	ND (0.13)	ND (0.11)
Ethylbenzene	mg/kg	7800	130000	10	48	0.0683	ND (0.00058)	ND (0.00032)	0.23	ND (0.00059)	ND (0.00050)
Freon 113	mg/kg	-	-	-	-	ND (0.00073)	ND (0.00096)	ND (0.00053)	ND (0.00085)	ND (0.00096)	ND (0.00082)
2-Hexanone	mg/kg	390	6500	1000	-	ND (0.0011)	ND (0.0014)	ND (0.00076)	ND (0.0012)	ND (0.0014)	ND (0.0012)
Isopropylbenzene	mg/kg	7800	130000	-	-	0.0274	ND (0.00017)	ND (0.000091)	0.0289	ND (0.00017)	ND (0.00014)
Methyl Acetate	mg/kg	78000	-	-	-	ND (0.0044)	ND (0.0058)	ND (0.0032)	ND (0.0051)	ND (0.0058)	ND (0.0049)
Methylcyclohexane	mg/kg	-	-	-	-	0.27	ND (0.00038)	ND (0.00021)	0.272	ND (0.00038)	ND (0.00032)
Methyl Tert Butyl Ether	mg/kg	780	13000	140	650	0.0044	ND (0.00052)	0.00036 J	ND (0.00046)	ND (0.00052)	ND (0.00045)
4-Methyl-2-pentanone(MIBK)	mg/kg	-	-	-	-	ND (0.0013)	ND (0.0017)	ND (0.00092)	ND (0.0015)	ND (0.0017)	ND (0.0014)
Methylene chloride	mg/kg	50	260	1400	-	ND (0.0021)	ND (0.0028)	0.0019 J	0.0070 J	ND (0.0028)	0.0028 J
Styrene	mg/kg	16000	260000	-	-	ND (0.00015)	ND (0.00020)	ND (0.00011)	ND (0.00018)	ND (0.00020)	ND (0.00017)
1,1,2,2-Tetrachloroethane	mg/kg	3.5	18	-	-	ND (0.00022)	ND (0.00029)	ND (0.00016)	ND (0.00026)	ND (0.00029)	ND (0.00025)
Tetrachloroethene	mg/kg	330	1700	47	-	ND (0.00029)	ND (0.00038)	ND (0.00021)	ND (0.00034)	ND (0.00038)	ND (0.00033)
Toluene	mg/kg	6300	100000	-	-	0.0088	ND (0.00023)	ND (0.00013)	0.0353	ND (0.00023)	ND (0.00020)
1,2,3-Trichlorobenzene	mg/kg	-	-	-	-	ND (0.00028)	ND (0.00036)	ND (0.00020)	ND (0.00032)	ND (0.00037)	ND (0.00031)
1,2,4-Trichlorobenzene	mg/kg	780	13000	94	-	ND (0.00023)	ND (0.00031)	ND (0.00017)	ND (0.00027)	ND (0.00031)	ND (0.00026)
1,1,1-Trichloroethane	mg/kg	160000	-	-	-	ND (0.00018)	ND (0.00024)	ND (0.00013)	ND (0.00021)	ND (0.00024)	ND (0.00020)
1,1,2-Trichloroethane	mg/kg	12	64	-	-	ND (0.00029)	ND (0.00039)	ND (0.00021)	ND (0.00034)	ND (0.00039)	ND (0.00033)
Trichloroethene	mg/kg	15	79	3	14	ND (0.00029)	ND (0.00039)	0.00069 J	ND (0.00034)	ND (0.00039)	ND (0.00033)
Trichlorofluoromethane	mg/kg	23000	390000	-	-	0.00066 J	ND (0.00066)	0.00066 J	ND (0.00059)	ND (0.00067)	ND (0.00057)
Vinyl chloride	mg/kg	0.97	5	1.4	6.4	ND (0.00024)	ND (0.00032)	ND (0.00018)	ND (0.00028)	ND (0.00032)	ND (0.00027)
m,p-Xylene	mg/kg	12000	190000	-	-	0.14	ND (0.00039)	0.00029 J	0.528	ND (0.00039)	ND (0.00033)
o-Xylene	mg/kg	12000	190000	-	-	0.0146	ND (0.00031)	ND (0.00017)	0.0754	ND (0.00031)	ND (0.00026)
Xylene (total)	mg/kg	12000	190000	-	-	0.155	ND (0.00031)	0.00029 J	0.603	ND (0.00031)	ND (0.00026)
MS Volatile TIC											
Total TIC, Volatile	mg/kg	-	-	-	-	0.987 J	0	0	0.615 J	0	0
Total Alkanes	mg/kg	-	-	-	-	0.782 J	0	0	0.443 J	0	0
MS Semi-volatiles (SW846 8270D)											
2-Chlorophenol	mg/kg	390	6500	-	-	ND (0.051)	ND (0.056)	ND (0.038)	ND (0.057)	ND (0.058)	ND (0.053)
4-Chloro-3-methyl phenol	mg/kg	-	-	-	-	ND (0.051)	ND (0.056)	ND (0.038)	ND (0.057)	ND (0.058)	ND (0.053)
2,4-Dichlorophenol	mg/kg	190	2700	-	-	ND (0.082)	ND (0.090)	ND (0.061)	ND (0.091)	ND (0.093)	ND (0.085)
2,4-Dimethylphenol	mg/kg	1300	18000	-	-	ND (0.085)	ND (0.094)	ND (0.063)	ND (0.095)	ND (0.097)	ND (0.089)
2,4-Dinitrophenol	mg/kg	130	1800	-	-	ND (0.062)	ND (0.068)	ND (0.046)	ND (0.069)	ND (0.071)	ND (0.064)
4,6-Dinitro-o-cresol	mg/kg	-	-	-	-	ND (0.062)	ND (0.068)	ND (0.046)	ND (0.069)	ND (0.071)	ND (0.064)
2-Methylphenol	mg/kg	320	4600	-	-	ND (0.058)	ND (0.063)	ND (0.043)	ND (0.065)	ND (0.066)	ND (0.060)
3&4-Methylphenol	mg/kg	-	-	-	-	ND (0.064)	ND (0.071)	ND (0.048)	ND (0.072)	ND (0.074)	ND (0.067)
2-Nitrophenol	mg/kg	-	-	-	-	ND (0.054)	ND (0.059)	ND (0.040)	ND (0.060)	ND (0.061)	ND (0.056)
4-Nitrophenol	mg/kg	-	-	-	-	ND (0.086)	ND (0.094)	ND (0.064)	ND (0.096)	ND (0.098)	ND (0.089)
Pentachlorophenol	mg/kg	1	4.4	-	-	ND (0.087)	ND (0.095)	ND (0.064)	ND (0.097)	ND (0.099)	ND (0.090)
Phenol	mg/kg	19000	270000	39000	-	ND (0.053)	ND (0.058)	ND (0.040)	ND (0.060)	ND (0.061)	ND (0.055)
2,3,4,6-Tetrachlorophenol	mg/kg	1900	27000	-	-	ND (0.052)	ND (0.057)	ND (0.039)	ND (0.058)	ND (0.060)	ND (0.054)
2,4,5-Trichlorophenol	mg/kg	6300	91000	-	-	ND (0.059)	ND (0.065)	ND (0.044)	ND (0.066)	ND (0.067)	ND (0.061)
2,4,6-Trichlorophenol	mg/kg	49	230	-	-	ND (0.048)	ND (0.052)	ND (0.035)	ND (0.053)	ND (0.054)	ND (0.050)
Acenaphthene	mg/kg	3600	50000	-	-	ND (0.015)	ND (0.016)	ND (0.011)	0.0719	ND (0.017)	ND (0.015)
Acenaphthylene	mg/kg	-	-	-	-	ND (0.016)	ND (0.018)	ND (0.012)	ND (0.018)	ND (0.019)	ND (0.017)
Acetophenone	mg/kg	7800	130000	-	-	ND (0.0089)	ND (0.0098)	ND (0.0066)	ND (0.010)	ND (0.010)	ND (0.0093)
Anthracene	mg/kg	18000	250000	-	-	ND (0.018)	ND (0.019)	ND (0.013)	0.0307 J	ND (0.020)	ND (0.018)
Atrazine	mg/kg	220	3200	-	-	ND (0.010)	ND (0.011)	ND (0.0074)	ND (0.011)	ND (0.011)	ND (0.010)
Benzo(a)anthracene	mg/kg	5.1	23	78000	370000	0.212	ND (0.018)	ND (0.012)	ND (0.018)	ND (0.019)	ND (0.017)
Benzo(a)pyrene	mg/kg	0.51	2.3	7800	16000	0.177	ND (0.017)	ND (0.011)	ND (0.017)	ND (0.018)	ND (0.016)
Benzo(b)fluoranthene	mg/kg	5.1	23	78000	370000	0.176	ND (0.019)	ND (0.013)	ND (0.019)	ND (0.019)	ND (0.018)
Benzo(g,h,i)perylene	mg/kg	-	-	-	-	0.17	ND (0.021)	ND (0.014)	ND (0.021)	ND (0.022)	ND (0.020)
Benzo(k)fluoranthene	mg/kg	51	230	780000	-	0.0647	ND (0.021)	ND (0.014)	ND (0.021)	ND (0.022)	ND (0.020)
4-Bromophenyl phenyl ether	mg/kg	-	-	-	-	ND (0.018)	ND (0.020)	ND (0.014)	ND (0.021)	ND (0.021)	ND (0.019)
Butyl benzyl phthalate	mg/kg	290	1300	-	-	ND (0.029)	ND (0.032)	ND (0.022)	ND (0.033)	ND (0.034)	ND (0.031)
1,1'-Biphenyl	mg/kg	87	450	-	-	ND (0.0059)	ND (0.0065)	ND (0.0044)	ND (0.0066)	ND (0.0067)	ND (0.0061)
Benzaldehyde	mg/kg	170	910	-	-	ND (0.012)	ND (0.013)	ND (0.0087)	ND (0.013)	ND (0.013)	ND (0.012)
2-Chloronaphthalene	mg/kg	4800	67000	-	-	ND (0.016)	ND (0.017)	ND (0.012)	ND (0.018)	ND (0.018)	ND (0.016)
4-Chloroaniline	mg/kg	2.7	13	-	-	ND (0.016)	ND (0.018)	ND (0.012)	ND (0.018)	ND (0.019)	ND (0.017)
Carbazole	mg/kg	-	-	-	-	ND (0.023)	ND (0.026)	ND (0.017)	ND (0.026)	ND (0.027)	ND (0.024)
Caprolactam	mg/kg	32000	460000	290	1300	ND (0.016)	ND (0.018)	ND (0.012)	ND (0.018)	ND (0.018)	ND (0.017)
Chrysene	mg/kg	510	2300	-	-	0.684	ND (0.019)	ND (0.013)	ND (0.019)	ND (0.020)	ND (0.018)
bis(2-Chloroethoxy)methane	mg/kg	190	2700	-	-	ND (0.020)	ND (0.022)	ND (0.015)	ND (0.023)	ND (0.023)	ND (0.021)
bis(2-Chloroethyl)ether	mg/kg	0.63	3.3	-	-	ND (0.015)	ND (0.017)	ND (0.011)	ND (0.017)	ND (0.017)	ND (0.016)
2,2'-Oxybis(1-chloropropane)	mg/kg	3100	52000	-	-	ND (0.015)	ND (0.017)	ND (0.011)	ND (0.017)	ND (0.017)	ND (0.016)
4-Chlorophenyl phenyl ether	mg/kg	-	-	-	-	ND (0.015)	ND (0.017)	ND (0.011)	ND (0.017)	ND (0.017)	ND (0.016)
2,4-Dinitrotoluene	mg/kg	-	-	-	-	ND (0.022)	ND (0.024)	ND (0.016)	ND (0.025)	ND (0.025)	ND (0.023)
2,6-Dinitrotoluene	mg/kg	-	-	-	-	ND (0.019)	ND (0.021)	ND (0.014)	ND (0.022)	ND (0.022)	ND (0.020)
3,3'-Dichlorobenzidine	mg/kg	1.2	5.7	-	-	ND (0.013)	ND (0.014)	ND (0.0096)	ND (0.014)	ND (0.015)	ND (0.013)
Dibenzo(a,h)anthracene	mg/kg	0.51	2.3	7800	37000	0.0471 J	ND (0.019)	ND (0.013)	ND (0.019)	ND (0.020)	ND (0.018)

Table 1
Hess Corporation Former Port Reading Terminal
750 Cliff Road, Port Reading, New Jersey
AOC 13 - Former Oily Water Lagoons September 2013 Soil Analytical Results

Dibenzofuran	mg/kg	-	-	-	-	ND (0.015)	ND (0.017)	ND (0.011)	0.0477 J	ND (0.017)	ND (0.016)
Di-n-butyl phthalate	mg/kg	6300	91000	-	-	ND (0.011)	ND (0.012)	ND (0.0084)	ND (0.013)	ND (0.013)	ND (0.012)
Di-n-octyl phthalate	mg/kg	630	9100	-	-	ND (0.025)	ND (0.027)	ND (0.018)	ND (0.028)	ND (0.028)	ND (0.026)
Diethyl phthalate	mg/kg	51000	730000	-	-	ND (0.017)	ND (0.019)	ND (0.013)	ND (0.019)	ND (0.020)	ND (0.018)
Dimethyl phthalate	mg/kg	-	-	-	-	ND (0.018)	ND (0.020)	ND (0.013)	ND (0.020)	ND (0.020)	ND (0.019)
bis(2-Ethylhexyl)phthalate	mg/kg	39	180	-	-	1.41	ND (0.049)	ND (0.033)	ND (0.050)	ND (0.051)	ND (0.047)
Fluoranthene	mg/kg	2400	33000	-	-	ND (0.022)	ND (0.025)	ND (0.017)	ND (0.025)	ND (0.026)	ND (0.023)
Fluorene	mg/kg	2400	33000	-	-	1.39	ND (0.018)	ND (0.012)	0.127	ND (0.019)	ND (0.017)
Hexachlorobenzene	mg/kg	0.43	2.3	-	-	ND (0.017)	ND (0.018)	ND (0.012)	ND (0.018)	ND (0.019)	ND (0.017)
Hexachlorobutadiene	mg/kg	8.9	47	-	-	ND (0.014)	ND (0.015)	ND (0.010)	ND (0.016)	ND (0.016)	ND (0.015)
Hexachlorocyclopentadiene	mg/kg	470	7800	2.7	-	ND (0.052)	ND (0.057)	ND (0.038)	ND (0.058)	ND (0.059)	ND (0.054)
Hexachloroethane	mg/kg	17	91	-	-	ND (0.014)	ND (0.015)	ND (0.010)	ND (0.016)	ND (0.016)	ND (0.015)
Indeno(1,2,3-cd)pyrene	mg/kg	5.1	23	78000	370000	0.0646	ND (0.019)	ND (0.013)	ND (0.020)	ND (0.020)	ND (0.018)
Isophorone	mg/kg	570	2700	-	-	ND (0.014)	ND (0.015)	ND (0.010)	ND (0.015)	ND (0.016)	ND (0.014)
2-Methylnaphthalene	mg/kg	240	3300	-	-	14.7	ND (0.031)	ND (0.021)	2.2	ND (0.032)	ND (0.029)
2-Nitroaniline	mg/kg	-	-	-	-	ND (0.022)	ND (0.025)	ND (0.017)	ND (0.025)	ND (0.025)	ND (0.023)
3-Nitroaniline	mg/kg	-	-	-	-	ND (0.020)	ND (0.022)	ND (0.015)	ND (0.023)	ND (0.023)	ND (0.021)
4-Nitroaniline	mg/kg	27	130	-	-	ND (0.020)	ND (0.022)	ND (0.015)	ND (0.022)	ND (0.023)	ND (0.021)
Naphthalene	mg/kg	2500	34000	5.7	27	3.77	ND (0.015)	ND (0.010)	1.29	ND (0.016)	ND (0.014)
Nitrobenzene	mg/kg	160	2600	7.5	36	ND (0.015)	ND (0.016)	ND (0.011)	ND (0.016)	ND (0.017)	ND (0.015)
N-Nitroso-di-n-propylamine	mg/kg	0.17	0.36	-	-	ND (0.012)	ND (0.014)	ND (0.0092)	ND (0.014)	ND (0.014)	ND (0.013)
N-Nitrosodiphenylamine	mg/kg	110	520	-	-	ND (0.030)	ND (0.033)	ND (0.023)	ND (0.034)	ND (0.035)	ND (0.031)
Phenanthrene	mg/kg	-	-	-	-	2.57	ND (0.025)	ND (0.017)	0.195	ND (0.026)	ND (0.024)
Pyrene	mg/kg	1800	25000	-	-	0.891	ND (0.021)	ND (0.014)	0.0410 J	ND (0.022)	ND (0.020)
1,2,4,5-Tetrachlorobenzene	mg/kg	23	390	-	-	ND (0.016)	ND (0.017)	ND (0.012)	ND (0.017)	ND (0.018)	ND (0.016)
MS Semi-volatile TIC											
Total TIC, Semi-Volatile	mg/kg	-	-	-	-	95.1 J	12.57 J	1.03 J	15.02 J	2.96 J	7.94 J
Total Alkanes	mg/kg	-	-	-	-	2.7 J	1.33 J	0	1.71 J	0	0.8 J
GC/LC Semi-volatiles (NJDEP EPH)											
EPH (C9-C28)	mg/kg	5300	75000	-	-	**8030**	ND (6.4)	ND (3.0)	531	199	150
EPH (>C28-C40)	mg/kg	5300	75000	-	-	1650	75.2	ND (3.6)	162	149	102
Total EPH (C9-C40)	mg/kg	5300	75000	-	-	**9680**	75.2	ND (3.0)	693	348	252
GC/LC Semi-volatiles (SW846 8082A)											
Aroclor 1016	mg/kg	0.25	1.1	-	-	ND (0.021)	ND (0.016)	ND (0.011)	ND (0.047)	ND (0.046)	ND (0.041)
Aroclor 1221	mg/kg	0.25	1.1	-	-	ND (0.049)	ND (0.037)	ND (0.026)	ND (0.11)	ND (0.11)	ND (0.095)
Aroclor 1232	mg/kg	0.25	1.1	-	-	ND (0.041)	ND (0.031)	ND (0.022)	ND (0.092)	ND (0.090)	ND (0.080)
Aroclor 1242	mg/kg	0.25	1.1	-	-	ND (0.026)	ND (0.019)	ND (0.014)	ND (0.058)	ND (0.056)	ND (0.050)
Aroclor 1248	mg/kg	0.25	1.1	-	-	ND (0.025)	ND (0.019)	ND (0.013)	ND (0.055)	ND (0.054)	ND (0.048)
Aroclor 1254	mg/kg	0.25	1.1	-	-	ND (0.038)	ND (0.029)	ND (0.020)	ND (0.085)	ND (0.083)	ND (0.074)
Aroclor 1260	mg/kg	0.25	1.1	-	-	ND (0.027)	ND (0.020)	ND (0.014)	ND (0.059)	ND (0.058)	ND (0.052)
Aroclor 1268	mg/kg	0.25	1.1	-	-	ND (0.024)	ND (0.018)	ND (0.013)	ND (0.053)	ND (0.052)	ND (0.047)
Aroclor 1262	mg/kg	0.25	1.1	-	-	ND (0.026)	ND (0.019)	ND (0.014)	ND (0.058)	ND (0.056)	ND (0.050)
Metals Analysis											
Aluminum	mg/kg	78000	-	-	-	20000	23600	2200	21700	24200	23600
Antimony	mg/kg	31	520	-	-	<2.0	<2.0	<2.1	<2.1	<2.2	<2.2
Arsenic	mg/kg	19	19	1100	5200	**58.6**	14.7	2.7	12.8	**25.9**	**22.1**
Barium	mg/kg	16000	260000	870000	-	268	50.5	<21	53.5	52.9	55.2
Beryllium	mg/kg	160	2600	2000	9300	2.3	1.4	0.23	1.2	1.4 [a]	1.3
Cadmium	mg/kg	71	1100	2600	12000	<0.50	<0.51	<0.54	<0.53	<1.1 [a]	<0.54
Calcium	mg/kg	-	-	-	-	2680	2590	<540	1900	1870	21100
Chromium	mg/kg	-	-	-	-	492	44.7	5.1	46	46.5 [a]	38.3
Cobalt	mg/kg	23	390	520	2500	10	11.5	<5.4	10.3	10.1	9.9
Copper	mg/kg	3100	52000	-	-	268	16.6	<2.7	14.3	16.6 [a]	15.5
Iron	mg/kg	-	-	-	-	37400	34200	7680	30800	56600	38500
Lead	mg/kg	400	800	-	-	129	15.9	<2.1	14.4	14.4 [a]	13.8
Magnesium	mg/kg	-	-	-	-	3840	8360	627	8460	8260	7220
Manganese	mg/kg	1900	31000	87000	400000	172	386	36.7	329	489 [a]	306
Mercury	mg/kg	23	390	520000	-	1.4	<0.060	<0.042	<0.057	<0.058	<0.057
Nickel	mg/kg	1600	26000	20000	93000	47.9	31.8	<4.3	29.1	28.6	26
Potassium	mg/kg	-	-	-	-	2530	5360	<1100	4990	5470	4950
Selenium	mg/kg	390	6500	-	-	2.8	<2.0	<2.1	<2.1	<4.5 [a]	<2.2
Silver	mg/kg	390	6500	-	-	<0.50	<0.51	<0.54	<0.53	<1.1 [a]	<0.54
Sodium	mg/kg	-	-	-	-	2720	4550	<1100	6630	8370	7360
Thallium	mg/kg	-	-	-	-	<0.99	<1.0	<1.1	<1.1	<2.2 [a]	<1.1
Vanadium	mg/kg	390	6500	170000	800000	140	48.5	<5.4	47.3	51.4	49.9
Zinc	mg/kg	23000	390000	-	-	219	83.5	9.7	77.5	79	69.5
General Chemistry											
Solids, Percent	%	-	-	-	-	61.7	53.6	77.1	55.3	53.3	58.5

Footnotes:
[a] Elevated detection limit due to dilution required for high interfering element.

Table 2
Hess Corporation Former Port Reading Terminal
750 Cliff Road, Port Reading, New Jersey
AOC 87 - September 2015 Soil Sample Analytical Results

Client Sample ID:		NJ Soil Remediation Standards Ingestion Dermal Exp. Pathway Residential	NJ Soil Remediation Standards Ingestion Dermal Exp. Pathway Non-Residential	NJ Soil Remediation Standards Inhalationl Exp. Pathway Residential	NJ Soil Remediation Standards Inhalationl Exp. Pathway Non-Residential	**FKD-SS-1**	**FKD-SS-1**	**FKD-SS-2**
Lab Sample ID:						**JC3371-1**	**JC3371-1R**	**JC3371-2**
Date Sampled:						**9/8/2015**	**9/8/2015**	**9/8/2015**
Matrix:						**Soil**	**Soil**	**Soil**
Depth:						**1.5-2.0 ft**	**1.5-2.0 ft**	**2.5-3.0 ft**
GC/MS Volatiles (SW846 8260C)								
Acetone	mg/kg	70000	-	-	-	-	0.0098	-
Benzene	mg/kg	3	16	2.2	11	-	ND (0.00041)	-
Bromochloromethane	mg/kg	-	-	-	-	-	ND (0.0041)	-
Bromodichloromethane	mg/kg	11	59	-	-	-	ND (0.0017)	-
Bromoform	mg/kg	88	460	-	-	-	ND (0.0041)	-
Bromomethane	mg/kg	110	1800	18	82	-	ND (0.0041)	-
2-Butanone (MEK)	mg/kg	47000	780000	-	-	-	ND (0.0083)	-
Carbon disulfide	mg/kg	-	-	-	-	-	ND (0.0017)	-
Carbon tetrachloride	mg/kg	7.6	40	1.4	6.9	-	ND (0.0017)	-
Chlorobenzene	mg/kg	510	8400	-	-	-	ND (0.0017)	-
Chloroethane	mg/kg	-	-	-	-	-	ND (0.0041)	-
Chloroform	mg/kg	780	13000	590	-	-	ND (0.0017)	-
Chloromethane	mg/kg	-	-	270	1200	-	ND (0.0041)	-
Cyclohexane	mg/kg	-	-	-	-	-	ND (0.0017)	-
1,2-Dibromo-3-chloropropane	mg/kg	0.87	4.5	0.026	0.12	-	ND (0.0017)	-
Dibromochloromethane	mg/kg	8.3	43	-	-	-	ND (0.0017)	-
1,2-Dibromoethane	mg/kg	0.35	1.8	0.085	0.41	-	ND (0.00083)	-
1,2-Dichlorobenzene	mg/kg	6700	110000	-	-	-	ND (0.00083)	-
1,3-Dichlorobenzene	mg/kg	6700	110000	-	-	-	ND (0.00083)	-
1,4-Dichlorobenzene	mg/kg	780	13000	-	-	-	ND (0.00083)	-
Dichlorodifluoromethane	mg/kg	16000	260000	-	-	-	ND (0.0041)	-
1,1-Dichloroethane	mg/kg	120	640	-	-	-	ND (0.00083)	-
1,2-Dichloroethane	mg/kg	5.8	30	71	320	-	ND (0.00083)	-
1,1-Dichloroethene	mg/kg	11	180	52	240	-	ND (0.00083)	-
cis-1,2-Dichloroethene	mg/kg	780	13000	-	-	-	ND (0.00083)	-
trans-1,2-Dichloroethene	mg/kg	1300	22000	-	-	-	ND (0.00083)	-
1,2-Dichloropropane	mg/kg	19	98	5.7	27	-	ND (0.0017)	-
cis-1,3-Dichloropropene	mg/kg	7	36	4.8	23	-	ND (0.0017)	-
trans-1,3-Dichloropropene	mg/kg	7	36	4.8	23	-	ND (0.0017)	-
Ethylbenzene	mg/kg	7	36	45	210	-	ND (0.00083)	-
Freon 113	mg/kg	7800	130000	10	48	-	ND (0.0041)	-
2-Hexanone	mg/kg	-	-	-	-	-	ND (0.0041)	-
Isopropylbenzene	mg/kg	390	6500	1000	-	-	ND (0.0017)	-
Methyl Acetate	mg/kg	7800	130000	-	-	-	ND (0.0041)	-
Methylcyclohexane	mg/kg	78000	-	-	-	-	ND (0.0017)	-
Methyl Tert Butyl Ether	mg/kg	-	-	-	-	-	ND (0.00083)	-
4-Methyl-2-pentanone(MIBK)	mg/kg	780	13000	140	650	-	ND (0.0041)	-
Methylene chloride	mg/kg	-	-	-	-	-	ND (0.0041)	-
Styrene	mg/kg	50	260	1400	-	-	ND (0.0017)	-
1,1,2,2-Tetrachloroethane	mg/kg	16000	260000	-	-	-	ND (0.0017)	-
Tetrachloroethene	mg/kg	3.5	18	-	-	-	ND (0.0017)	-
Toluene	mg/kg	330	1700	47	-	-	ND (0.00083)	-
1,2,3-Trichlorobenzene	mg/kg	6300	100000	-	-	-	ND (0.0041)	-
1,2,4-Trichlorobenzene	mg/kg	-	-	-	-	-	ND (0.0041)	-
1,1,1-Trichloroethane	mg/kg	780	13000	94	-	-	ND (0.0017)	-
1,1,2-Trichloroethane	mg/kg	160000	-	-	-	-	ND (0.0017)	-
Trichloroethene	mg/kg	12	64	-	-	-	ND (0.00083)	-
Trichlorofluoromethane	mg/kg	15	79	3	14	-	ND (0.0041)	-
Vinyl chloride	mg/kg	23000	390000	-	-	-	ND (0.0017)	-
m,p-Xylene	mg/kg	0.97	5	1.4	6.4	-	0.00056 J	-
o-Xylene	mg/kg	12000	190000	-	-	-	ND (0.00083)	-
Xylene (total)	mg/kg	12000	190000	-	-	-	0.00078 J	-
		12000	190000	-	-			
GC/MS Volatile TIC								
Total TIC, Volatile	mg/kg	-	-	-	-	-	0	-
Total Alkanes	mg/kg	-	-	-	-	-	0	-
GC/MS Semi-volatiles (SW846 8270D)								
2-Chlorophenol	mg/kg	390	6500	-	-	-	ND (0.072)	-

Table 2
Hess Corporation Former Port Reading Terminal
750 Cliff Road, Port Reading, New Jersey
AOC 87 - September 2015 Soil Sample Analytical Results

4-Chloro-3-methyl phenol	mg/kg	-	-	-	-	-	ND (0.18)	-
2,4-Dichlorophenol	mg/kg	190	2700	-	-	-	ND (0.18)	-
2,4-Dimethylphenol	mg/kg	1300	18000	-	-	-	ND (0.18)	-
2,4-Dinitrophenol	mg/kg	130	1800	-	-	-	ND (0.18)	-
4,6-Dinitro-o-cresol	mg/kg	-	-	-	-	-	ND (0.18)	-
2-Methylphenol	mg/kg	320	4600	-	-	-	ND (0.072)	-
3&4-Methylphenol	mg/kg	-	-	-	-	-	ND (0.072)	-
2-Nitrophenol	mg/kg	-	-	-	-	-	ND (0.18)	-
4-Nitrophenol	mg/kg	-	-	-	-	-	ND (0.36)	-
Pentachlorophenol	mg/kg	1	4.4	-	-	-	ND (0.18)	-
Phenol	mg/kg	19000	270000	39000	-	-	ND (0.072)	-
2,3,4,6-Tetrachlorophenol	mg/kg	1900	27000	-	-	-	ND (0.18)	-
2,4,5-Trichlorophenol	mg/kg	6300	91000	-	-	-	ND (0.18)	-
2,4,6-Trichlorophenol	mg/kg	49	230	-	-	-	ND (0.18)	-
Acenaphthene	mg/kg	3600	50000	-	-	-	ND (0.036)	-
Acenaphthylene	mg/kg	-	-	-	-	-	ND (0.036)	-
Acetophenone	mg/kg	7800	130000	-	-	-	ND (0.18)	-
Anthracene	mg/kg	18000	250000	-	-	-	0.0294 J	-
Atrazine	mg/kg	220	3200	-	-	-	ND (0.072)	-
Benzo(a)anthracene	mg/kg	5.1	23	78000	370000	-	0.0604	-
Benzo(a)pyrene	mg/kg	0.51	2.3	7800	16000	-	0.0789	-
Benzo(b)fluoranthene	mg/kg	5.1	23	78000	370000	-	0.093	-
Benzo(g,h,i)perylene	mg/kg	-	-	-	-	-	0.0739	-
Benzo(k)fluoranthene	mg/kg	51	230	780000	-	-	0.0327 J	-
4-Bromophenyl phenyl ether	mg/kg	-	-	-	-	-	ND (0.072)	-
Butyl benzyl phthalate	mg/kg	290	1300	-	-	-	ND (0.072)	-
1,1'-Biphenyl	mg/kg	87	450	-	-	-	ND (0.072)	-
Benzaldehyde	mg/kg	170	910	-	-	-	ND (0.18)	-
2-Chloronaphthalene	mg/kg	4800	67000	-	-	-	ND (0.072)	-
4-Chloroaniline	mg/kg	2.7	13	-	-	-	ND (0.18)	-
Carbazole	mg/kg	-	-	-	-	-	ND (0.072)	-
Caprolactam	mg/kg	32000	460000	290	1300	-	ND (0.072)	-
Chrysene	mg/kg	510	2300	-	-	-	0.102	-
bis(2-Chloroethoxy)methane	mg/kg	190	2700	-	-	-	ND (0.072)	-
bis(2-Chloroethyl)ether	mg/kg	0.63	3.3	-	-	-	ND (0.072)	-
bis(2-Chloroisopropyl)ether	mg/kg	-	-	-	-	-	ND (0.072)	-
4-Chlorophenyl phenyl ether	mg/kg	3100	52000	-	-	-	ND (0.072)	-
2,4-Dinitrotoluene	mg/kg	-	-	-	-	-	ND (0.036)	-
2,6-Dinitrotoluene	mg/kg	-	-	-	-	-	ND (0.036)	-
3,3'-Dichlorobenzidine	mg/kg	-	-	-	-	-	ND (0.072)	-
1,4-Dioxane	mg/kg	1.2	5.7	-	-	-	ND (0.036)	-
Dibenzo(a,h)anthracene	mg/kg	0.51	2.3	7800	37000	-	0.0207 J	-
Dibenzofuran	mg/kg	-	-	-	-	-	ND (0.072)	-
Di-n-butyl phthalate	mg/kg	6300	91000	-	-	-	ND (0.072)	-
Di-n-octyl phthalate	mg/kg	630	9100	-	-	-	ND (0.072)	-
Diethyl phthalate	mg/kg	51000	730000	-	-	-	ND (0.072)	-
Dimethyl phthalate	mg/kg	-	-	-	-	-	ND (0.072)	-
bis(2-Ethylhexyl)phthalate	mg/kg	39	180	-	-	-	0.0709 J	-
Fluoranthene	mg/kg	2400	33000	-	-	-	0.126	-
Fluorene	mg/kg	2400	33000	-	-	-	0.0218 J	-
Hexachlorobenzene	mg/kg	0.43	2.3	-	-	-	ND (0.072)	-
Hexachlorobutadiene	mg/kg	8.9	47	-	-	-	ND (0.036)	-
Hexachlorocyclopentadiene	mg/kg	470	7800	2.7	-	-	ND (0.36)	-
Hexachloroethane	mg/kg	17	91	-	-	-	ND (0.18)	-
Indeno(1,2,3-cd)pyrene	mg/kg	5.1	23	78000	370000	-	0.0621	-
Isophorone	mg/kg	570	2700	-	-	-	ND (0.072)	-
2-Methylnaphthalene	mg/kg	240	3300	-	-	-	0.0511 J	-
2-Nitroaniline	mg/kg	-	-	-	-	-	ND (0.18)	-
3-Nitroaniline	mg/kg	-	-	-	-	-	ND (0.18)	-
4-Nitroaniline	mg/kg	27	130	-	-	-	ND (0.18)	-
Naphthalene	mg/kg	2500	34000	5.7	27	-	0.0168 J	-
Nitrobenzene	mg/kg	160	2600	7.5	36	-	ND (0.072)	-
N-Nitroso-di-n-propylamine	mg/kg	0.17	0.36	-	-	-	ND (0.072)	-
N-Nitrosodiphenylamine	mg/kg	110	520	-	-	-	ND (0.18)	-
Phenanthrene	mg/kg	-	-	-	-	-	0.101	-
Pyrene	mg/kg	1800	25000	-	-	-	0.133	-
1,2,4,5-Tetrachlorobenzene	mg/kg	23	390	-	-	-	ND (0.18)	-
GC/MS Semi-volatile TIC								

Table 2
Hess Corporation Former Port Reading Terminal
750 Cliff Road, Port Reading, New Jersey
AOC 87 - September 2015 Soil Sample Analytical Results

Total TIC, Semi-Volatile	mg/kg	-	-	-	-	-	5.29 J	-
Total Alkanes	mg/kg	-	-	-	-	-	1.22 J	-
GC Semi-volatiles (NJDEP EPH)								
EPH (C9-C28)	mg/kg	5300	75000	-	-	93.6	-	82.4
EPH (>C28-C40)	mg/kg	5300	75000	-	-	ND (7.1)	-	ND (7.3)
Total EPH (C9-C40)	mg/kg	5300	75000	-	-	93.6	-	82.4
GC Semi-volatiles (SW846 8082A)								
Aroclor 1016	mg/kg	0.25	1.1	-	-	-	ND (0.032)	-
Aroclor 1221	mg/kg	0.25	1.1	-	-	-	ND (0.032)	-
Aroclor 1232	mg/kg	0.25	1.1	-	-	-	ND (0.032)	-
Aroclor 1242	mg/kg	0.25	1.1	-	-	-	ND (0.032)	-
Aroclor 1248	mg/kg	0.25	1.1	-	-	-	ND (0.032)	-
Aroclor 1254	mg/kg	0.25	1.1	-	-	-	0.0679	-
Aroclor 1260	mg/kg	0.25	1.1	-	-	-	ND (0.032)	-
Aroclor 1268	mg/kg	0.25	1.1	-	-	-	ND (0.032)	-
Aroclor 1262	mg/kg	0.25	1.1	-	-	-	ND (0.032)	-
Metals Analysis								
Aluminum	mg/kg	78000	-	-	-	-	7970	-
Antimony	mg/kg	31	520	-	-	-	ND (2.2)	-
Arsenic	mg/kg	19	19	1100	5200	-	4.8	-
Barium	mg/kg	16000	260000	870000	-	-	43.3	-
Beryllium	mg/kg	160	2600	2000	9300	-	0.65	-
Cadmium	mg/kg	71	1100	2600	12000	-	ND (0.54)	-
Calcium	mg/kg	-	-	-	-	-	7200	-
Chromium	mg/kg	-	-	-	-	-	24.6	-
Cobalt	mg/kg	23	390	520	2500	-	6.1	-
Copper	mg/kg	3100	52000	-	-	-	41.3	-
Iron	mg/kg	-	-	-	-	-	15600	-
Lead	mg/kg	400	800	-	-	-	49.2	-
Magnesium	mg/kg	-	-	-	-	-	3170	-
Manganese	mg/kg	1900	31000	87000	400000	-	179	-
Mercury	mg/kg	23	390	520000	-	-	0.056	-
Nickel	mg/kg	1600	26000	20000	93000	-	23.1	-
Potassium	mg/kg	-	-	-	-	-	1470	-
Selenium	mg/kg	390	6500	-	-	-	ND (2.2)	-
Silver	mg/kg	390	6500	-	-	-	1.1	-
Sodium	mg/kg	-	-	-	-	-	ND (1100)	-
Thallium	mg/kg	-	-	-	-	-	ND (1.1)	-
Vanadium	mg/kg	390	6500	170000	800000	-	27.1	-
Zinc	mg/kg	23000	390000	-	-	-	102	-
General Chemistry								
Solids, Percent	%	-	-	-	-	92.7	-	87.5

Table 3a
Hess Corporation Former Port Reading Terminal
750 Cliff Road, Port Reading, New Jersey
Temporary Well Analytical - October 2009

Client Sample ID:		**NJ Groundwater Criteria (N.J.A.C. 7:9C 9/4/18)**	**SLF-TW1**	**SLF-TW3**	**SLF-TW4**	**SLF-TW5**	**SLF-TW6**	**SLF-TW7**	**SLF-TW8**	**SLF-TW9**	**SLF-TW10**	**SLF-TW11**	**SLF-TW12**	**FIELD BLANK**	**TRIP BLANK**
Lab Sample ID:			**JA31453-1**	**JA31453-2**	**JA31453-3**	**JA31453-4**	**JA31453-5**	**JA31453-6**	**JA31453-7**	**JA31453-8**	**JA31453-9**	**JA31453-10**	**JA31453-11**	**JA31453-12**	**JA31453-13**
Date Sampled:			**10/27/2009**	**10/27/2009**	**10/27/2009**	**10/27/2009**	**10/27/2009**	**10/27/2009**	**10/27/2009**	**10/27/2009**	**10/27/2009**	**10/27/2009**	**10/27/2009**	**10/27/2009**	**10/27/2009**
Matrix:			**Ground Water**	**Ground Water**	**Ground Water**	**Ground Water**	**Ground Water**	**Ground Water**	**Ground Water**	**Ground Water**	**Ground Water**	**Ground Water**	**Ground Water**	**Field Blank**	**Trip Blank**
MS Volatiles (SW846 8260B)															
Acetone	ug/l	6000	16.4	19.8	30.5	7.3 J	7.8 J	ND (2.9)	48.3	5.8 J	24.2	ND (2.9)	ND (2.9)	ND (2.9)	ND (2.9)
Benzene	ug/l	1	**9.6**	**69.6**	**27.3**	**9**	**4.7**	0.39 J	**172**	**22.4**	**25.6**	**19.8**	ND (0.23)	ND (0.23)	ND (0.23)
Bromodichloromethane	ug/l	1	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)
Bromoform	ug/l	4	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)
Bromomethane	ug/l	10	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)
2-Butanone (MEK)	ug/l	300	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	14.6	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)
Carbon disulfide	ug/l	700	ND (0.74)	ND (0.74)	ND (0.74)	ND (0.74)	ND (0.74)	ND (0.74)	ND (0.74)	ND (0.74)	ND (0.74)	ND (0.74)	ND (0.74)	ND (0.74)	ND (0.74)
Carbon tetrachloride	ug/l	1	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)
Chlorobenzene	ug/l	50	ND (0.39)	0.68 J	3.7	ND (0.39)	ND (0.39)	ND (0.39)	ND (0.39)	1.3	ND (0.39)	3.3	ND (0.39)	ND (0.39)	ND (0.39)
Chloroethane	ug/l	-	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)
Chloroform	ug/l	70	ND (0.23)	0.75 J	0.39 J	0.43 J	ND (0.23)	ND (0.23)	1.1	1.8	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)
Chloromethane	ug/l	-	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)
Dibromochloromethane	ug/l	1	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)
1,1-Dichloroethane	ug/l	50	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)
1,2-Dichloroethane	ug/l	2	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)
1,1-Dichloroethene	ug/l	1	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)
cis-1,2-Dichloroethene	ug/l	70	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)
trans-1,2-Dichloroethene	ug/l	100	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)
1,2-Dichloroethene (total)	ug/l	70	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)
1,2-Dichloropropane	ug/l	1	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.27)
cis-1,3-Dichloropropene	ug/l	1	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)
trans-1,3-Dichloropropene	ug/l	1	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)
Ethylbenzene	ug/l	700	45.1	55.2	40.8	14.3	20.9	0.46 J	113	39.3	0.72 J	8.4	ND (0.27)	ND (0.27)	ND (0.27)
2-Hexanone	ug/l	40	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)
4-Methyl-2-pentanone(MIBK)	ug/l	-	ND (0.86)	ND (0.86)	ND (0.86)	ND (0.86)	ND (0.86)	ND (0.86)	ND (0.86)	ND (0.86)	ND (0.86)	ND (0.86)	ND (0.86)	ND (0.86)	ND (0.86)
Methylene chloride	ug/l	3	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)
Styrene	ug/l	100	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)
1,1,2,2-Tetrachloroethane	ug/l	1	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)
Tetrachloroethene	ug/l	1	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.27)
Toluene	ug/l	600	0.69 J	1.5	1.9	1.7	0.57 J	ND (0.30)	13	0.81 J	0.93 J	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)
1,1,1-Trichloroethane	ug/l	30	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)
1,1,2-Trichloroethane	ug/l	3	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)
Trichloroethene	ug/l	1	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)
Vinyl chloride	ug/l	1	ND (0.44)	ND (0.44)	ND (0.44)	ND (0.44)	ND (0.44)	ND (0.44)	ND (0.44)	ND (0.44)	ND (0.44)	ND (0.44)	ND (0.44)	ND (0.44)	ND (0.44)
Xylene (total)	ug/l	1000	3.1	37.3	12.6	9.4	6.7	0.77 J	39.8	37.2	4	11.7	ND (0.25)	ND (0.25)	ND (0.25)
MS Volatile TIC															
Total TIC, Volatile	ug/l	-	462 J	468 J	306 J	206 J	196 J	87.9 J	874 J	310 J	116.7 J	200.6 J	0	0	0
MS Semi-volatiles (SW846 8270C)															
2-Chlorophenol	ug/l	40	ND (1.1)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.2)	ND (1.3)	ND (1.2)	ND (1.2)	ND (1.1)	-
4-Chloro-3-methyl phenol	ug/l	-	ND (1.1)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.3)	ND (1.2)	ND (1.2)	ND (1.1)	-
2,4-Dichlorophenol	ug/l	20	ND (1.2)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.2)	ND (1.2)	ND (1.3)	ND (1.4)	ND (1.5)	ND (1.4)	ND (1.4)	ND (1.2)	-
2,4-Dimethylphenol	ug/l	100	ND (1.7)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.7)	ND (1.7)	ND (1.8)	2.3 J	ND (2.0)	ND (1.9)	ND (1.9)	ND (1.7)	-
2,4-Dinitrophenol	ug/l	40	ND (0.74)	ND (0.84)	ND (0.86)	ND (0.85)	ND (0.74)	ND (0.74)	ND (0.80)	ND (0.84)	ND (0.88)	ND (0.84)	ND (0.86)	ND (0.75)	-
4,6-Dinitro-o-cresol	ug/l	0.7	ND (0.51)	ND (0.58)	ND (0.60)	ND (0.59)	ND (0.51)	ND (0.51)	ND (0.56)	ND (0.58)	ND (0.61)	ND (0.58)	ND (0.60)	ND (0.52)	-
2-Methylphenol	ug/l	50	ND (1.1)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.1)	-
3&4-Methylphenol	ug/l	50	ND (1.0)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.0)	ND (1.0)	ND (1.1)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.1)	-
2-Nitrophenol	ug/l	-	ND (1.2)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.2)	ND (1.2)	ND (1.3)	ND (1.4)	ND (1.5)	ND (1.4)	ND (1.4)	ND (1.3)	-
4-Nitrophenol	ug/l	-	ND (0.83)	ND (0.94)	ND (0.96)	ND (0.95)	ND (0.83)	ND (0.83)	ND (0.90)	ND (0.94)	ND (0.99)	ND (0.94)	ND (0.96)	ND (0.84)	-
Pentachlorophenol	ug/l	0.3	ND (0.80)	ND (0.91)	ND (0.93)	ND (0.92)	ND (0.80)	ND (0.80)	ND (0.87)	ND (0.91)	ND (0.95)	ND (0.91)	ND (0.93)	ND (0.82)	-
Phenol	ug/l	2000	ND (0.58)	ND (0.66)	ND (0.67)	ND (0.66)	ND (0.58)	ND (0.58)	ND (0.63)	ND (0.66)	ND (0.69)	ND (0.66)	ND (0.67)	ND (0.59)	-
2,4,5-Trichlorophenol	ug/l	700	ND (1.3)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.3)	ND (1.3)	ND (1.4)	ND (1.5)	ND (1.6)	ND (1.5)	ND (1.5)	ND (1.3)	-
2,4,6-Trichlorophenol	ug/l	20	ND (1.2)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.2)	ND (1.2)	ND (1.3)	ND (1.4)	ND (1.5)	ND (1.4)	ND (1.4)	ND (1.2)	-
Acenaphthene	ug/l	400	3.7	2.2	3.8	11.6	1.4	0.60 J	4.1	1.3	4.7	ND (0.42)	ND (0.43)	ND (0.37)	-
Acenaphthylene	ug/l	-	ND (0.27)	ND (0.31)	ND (0.32)	ND (0.31)	ND (0.27)	ND (0.27)	ND (0.29)	ND (0.31)	ND (0.33)	ND (0.31)	ND (0.32)	ND (0.28)	-
Anthracene	ug/l	2000	1.6	0.43 J	0.63 J	4.6	0.29 J	0.26 J	0.52 J	0.36 J	1.6	ND (0.18)	ND (0.19)	ND (0.17)	-
Benzo(a)anthracene	ug/l	0.1	**2.8**	ND (0.14)	ND (0.14)	**3.2**	ND (0.12)	ND (0.12)	ND (0.13)	ND (0.14)	**1.1 J**	ND (0.14)	ND (0.14)	ND (0.12)	-
Benzo(a)pyrene	ug/l	0.1	**1.1**	ND (0.11)	ND (0.11)	**1.8**	ND (0.095)	ND (0.095)	ND (0.10)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.097)	-
Benzo(b)fluoranthene	ug/l	0.2	**0.43 J**	ND (0.28)	ND (0.29)	ND (0.28)	ND (0.25)	ND (0.25)	ND (0.26)	ND (0.28)	ND (0.29)	ND (0.28)	ND (0.29)	ND (0.25)	-
Benzo(g,h,i)perylene	ug/l	-	ND (0.12)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.12)	ND (0.12)	ND (0.13)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.12)	-
Benzo(k)fluoranthene	ug/l	0.5	ND (0.38)	ND (0.43)	ND (0.44)	ND (0.43)	ND (0.38)	ND (0.38)	ND (0.40)	ND (0.43)	ND (0.45)	ND (0.43)	ND (0.44)	ND (0.38)	-
4-Bromophenyl phenyl ether	ug/l	-	ND (0.35)	ND (0.40)	ND (0.41)	ND (0.40)	ND (0.35)	ND (0.35)	ND (0.37)	ND (0.40)	ND (0.42)	ND (0.40)	ND (0.41)	ND (0.36)	-
Butyl benzyl phthalate	ug/l	100	ND (0.25)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.25)	ND (0.25)	ND (0.26)	ND (0.29)	ND (0.30)	ND (0.29)	ND (0.29)	ND (0.26)	-
2-Chloronaphthalene	ug/l	600	ND (0.42)	ND (0.47)	ND (0.48)	ND (0.48)	ND (0.42)	ND (0.42)	ND (0.44)	ND (0.47)	ND (0.50)	ND (0.47)	ND (0.48)	ND (0.42)	-
4-Chloroaniline	ug/l	30	ND (0.25)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.25)	ND (0.25)	ND (0.27)	ND (0.29)	ND (0.30)	ND (0.29)	ND (0.29)	ND (0.26)	-
Carbazole	ug/l	-	ND (0.17)	0.62 J	2.0 J	ND (0.19)	ND (0.17)	ND (0.17)	0.88 J	0.60 J	ND (0.20)	ND (0.19)	ND (0.19)	ND (0.17)	-
Chrysene	ug/l	5	4.5	ND (0.12)	ND (0.13)	5	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.12)	1.8	ND (0.12)	ND (0.13)	ND (0.11)	-
bis(2-Chloroethoxy)methane	ug/l	-	ND (0.25)	ND (0.28)	ND (0.29)	ND (0.29)	ND (0.25)	ND (0.25)	ND (0.26)	ND (0.28)	ND (0.30)	ND (0.28)	ND (0.29)	ND (0.25)	-
bis(2-Chloroethyl)ether	ug/l	7	ND (0.31)	ND (0.35)	ND (0.36)	ND (0.36)	ND (0.31)	ND (0.31)	ND (0.33)	ND (0.35)	ND (0.37)	ND (0.35)	ND (0.36)	ND (0.32)	-
2,2'-Oxybis(1-chloropropane)	ug/l	300	ND (0.39)	ND (0.44)	ND (0.45)	ND (0.45)	ND (0.39)	ND (0.39)	ND (0.41)	ND (0.44)	ND (0.46)	ND (0.44)	ND (0.45)	ND (0.40)	-
4-Chlorophenyl phenyl ether	ug/l	-	ND (0.35)	ND (0.40)	ND (0.41)	ND (0.41)	ND (0.35)	ND (0.35)	ND (0.37)	ND (0.40)	ND (0.42)	ND (0.40)	ND (0.41)	ND (0.36)	-
1,2-Dichlorobenzene	ug/l	600	ND (0.42)	ND (0.48)	ND (0.49)	ND (0.49)	ND (0.42)	ND (0.42)	ND (0.44)	ND (0.48)	ND (0.50)	ND (0.48)	ND (0.49)	ND (0.43)	-
1,3-Dichlorobenzene	ug/l	600	ND (0.36)	ND (0.41)	ND (0.42)	ND (0.41)	ND (0.36)	ND (0.36)	ND (0.38)	ND (0.41)	ND (0.43)	ND (0.41)	ND (0.42)	ND (0.37)	-
1,4-Dichlorobenzene	ug/l	75	ND (0.39)	ND (0.44)	ND (0.45)	ND (0.45)	ND (0.39)	ND (0.39)	ND (0.41)	ND (0.44)	ND (0.46)	ND (0.44)	ND (0.45)	ND (0.40)	-

Table 3a
Hess Corporation Former Port Reading Terminal
750 Cliff Road, Port Reading, New Jersey
Temporary Well Data - 2009

2,4-Dinitrotoluene	ug/l	10	ND (0.22)	ND (0.25)	ND (0.26)	ND (0.25)	ND (0.22)	ND (0.22)	ND (0.23)	ND (0.25)	ND (0.26)	ND (0.25)	ND (0.26)	ND (0.22)	-
2,6-Dinitrotoluene	ug/l	10	ND (0.33)	ND (0.37)	ND (0.38)	ND (0.37)	ND (0.33)	ND (0.33)	ND (0.34)	ND (0.37)	ND (0.39)	ND (0.37)	ND (0.38)	ND (0.33)	-
3,3'-Dichlorobenzidine	ug/l	30	ND (0.30)	ND (0.34)	ND (0.34)	ND (0.34)	ND (0.30)	ND (0.30)	ND (0.31)	ND (0.34)	ND (0.35)	ND (0.34)	ND (0.34)	ND (0.30)	-
Dibenzo(a,h)anthracene	ug/l	0.3	ND (0.15)	ND (0.17)	ND (0.18)	ND (0.18)	ND (0.15)	ND (0.15)	ND (0.16)	ND (0.17)	ND (0.18)	ND (0.17)	ND (0.18)	ND (0.16)	-
Dibenzofuran	ug/l	-	2.4 J	0.98 J	1.4 J	ND (0.35)	0.70 J	0.36 J	1.9 J	0.73 J	ND (0.36)	ND (0.35)	ND (0.35)	ND (0.31)	-
Di-n-butyl phthalate	ug/l	700	ND (0.19)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.19)	ND (0.19)	ND (0.20)	ND (0.22)	ND (0.23)	ND (0.22)	ND (0.22)	ND (0.19)	-
Di-n-octyl phthalate	ug/l	100	ND (0.40)	ND (0.45)	ND (0.46)	ND (0.45)	ND (0.40)	16.6	ND (0.42)	ND (0.45)	ND (0.47)	ND (0.45)	ND (0.46)	ND (0.40)	-
Diethyl phthalate	ug/l	6000	ND (0.17)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.17)	ND (0.17)	ND (0.17)	ND (0.19)	ND (0.20)	ND (0.19)	ND (0.19)	ND (0.17)	-
Dimethyl phthalate	ug/l	-	ND (0.23)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.23)	ND (0.23)	ND (0.24)	ND (0.26)	ND (0.27)	ND (0.26)	ND (0.26)	ND (0.23)	-
bis(2-Ethylhexyl)phthalate	ug/l	3	1.1 J	ND (0.37)	ND (0.38)	**7.1**	ND (0.33)	ND (0.33)	ND (0.34)	ND (0.37)	1.8 J	ND (0.37)	ND (0.38)	ND (0.33)	-
Fluoranthene	ug/l	300	1.4	ND (0.19)	0.52 J	4.5	ND (0.17)	0.21 J	0.26 J	ND (0.19)	1.4	ND (0.19)	ND (0.20)	ND (0.17)	-
Fluorene	ug/l	300	7	2.5	3.3	12	2	1.1	5.6	2	4.9	ND (0.30)	ND (0.31)	ND (0.27)	-
Hexachlorobenzene	ug/l	0.02	ND (0.37)	ND (0.42)	ND (0.43)	ND (0.43)	ND (0.37)	ND (0.37)	ND (0.39)	ND (0.42)	ND (0.44)	ND (0.42)	ND (0.43)	ND (0.38)	-
Hexachlorobutadiene	ug/l	1	ND (0.37)	ND (0.42)	ND (0.43)	ND (0.43)	ND (0.37)	ND (0.37)	ND (0.39)	ND (0.42)	ND (0.44)	ND (0.42)	ND (0.43)	ND (0.38)	-
Hexachlorocyclopentadiene	ug/l	40	ND (0.67)	ND (0.76)	ND (0.78)	ND (0.77)	ND (0.67)	ND (0.67)	ND (0.71)	ND (0.76)	ND (0.80)	ND (0.76)	ND (0.78)	ND (0.69)	-
Hexachloroethane	ug/l	7	ND (0.26)	ND (0.30)	ND (0.31)	ND (0.30)	ND (0.26)	ND (0.26)	ND (0.28)	ND (0.30)	ND (0.31)	ND (0.30)	ND (0.31)	ND (0.27)	-
Indeno(1,2,3-cd)pyrene	ug/l	0.2	ND (0.13)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.13)	ND (0.13)	ND (0.14)	ND (0.15)	ND (0.16)	ND (0.15)	ND (0.15)	ND (0.13)	-
Isophorone	ug/l	40	ND (0.25)	ND (0.28)	ND (0.29)	ND (0.29)	ND (0.25)	ND (0.25)	ND (0.26)	ND (0.28)	ND (0.30)	ND (0.28)	ND (0.29)	ND (0.25)	-
2-Methylnaphthalene	ug/l	30	**89.3**	24.9	**32.6**	**61**	11	6.6	**73.9**	19.2	21.4	ND (0.75)	ND (0.77)	ND (0.67)	-
2-Nitroaniline	ug/l	-	ND (0.24)	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.24)	ND (0.24)	ND (0.25)	ND (0.27)	ND (0.28)	ND (0.27)	ND (0.27)	ND (0.24)	-
3-Nitroaniline	ug/l	-	ND (0.29)	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.29)	ND (0.29)	ND (0.30)	ND (0.33)	ND (0.34)	ND (0.33)	ND (0.33)	ND (0.29)	-
4-Nitroaniline	ug/l	-	ND (0.18)	ND (0.20)	ND (0.21)	ND (0.20)	ND (0.18)	ND (0.18)	ND (0.19)	ND (0.20)	ND (0.21)	ND (0.20)	ND (0.21)	ND (0.18)	-
Naphthalene	ug/l	300	29.3 B	21.2 B	40.0 B	33.6 B	2.8 B [a]	1.3 B [a]	37.9	21.7 B	5.5 B [a]	ND (0.49)	ND (0.50)	ND (0.44)	-
Nitrobenzene	ug/l	6	ND (0.25)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.25)	ND (0.25)	ND (0.27)	ND (0.29)	ND (0.30)	ND (0.29)	ND (0.29)	ND (0.26)	-
N-Nitroso-di-n-propylamine	ug/l	10	ND (0.44)	ND (0.50)	ND (0.51)	ND (0.50)	ND (0.44)	ND (0.44)	ND (0.46)	ND (0.50)	ND (0.52)	ND (0.50)	ND (0.51)	ND (0.45)	-
N-Nitrosodiphenylamine	ug/l	10	ND (0.22)	ND (0.24)	ND (0.25)	ND (0.25)	ND (0.22)	ND (0.22)	ND (0.23)	ND (0.24)	ND (0.26)	ND (0.24)	ND (0.25)	ND (0.22)	-
Phenanthrene	ug/l	-	17	2.7	3.4	27.6	1.9	1.6	6.4	2.9	10.7	ND (0.24)	ND (0.24)	ND (0.21)	-
Pyrene	ug/l	200	3.6	ND (0.18)	0.39 J	8.3	ND (0.16)	0.37 J	0.29 J	0.38 J	2.6	ND (0.18)	ND (0.18)	ND (0.16)	-
1,2,4-Trichlorobenzene	ug/l	9	ND (0.44)	ND (0.49)	ND (0.51)	ND (0.50)	ND (0.44)	ND (0.44)	ND (0.46)	ND (0.49)	ND (0.52)	ND (0.49)	ND (0.51)	ND (0.44)	-
MS Semi-volatile TIC														
Total TIC, Semi-Volatile	ug/l	-	835 J	320.6 J	433.1 J	966 J	207.8 J	117.8 J	1034 J	198.8 J	751 J	0	13.1 J	0	-
GC/LC Semi-volatiles (SW846 8081A)														
Aldrin	ug/l	0.04	ND (0.0031)	ND (0.0033)	ND (0.0033)	ND (0.0031)	(0.0032)	ND (0.0032)	ND (0.0033)	ND (0.0031)	ND (0.0033)	ND (0.0033)	ND (0.0030)	ND (0.0030)	-
alpha-BHC	ug/l	0.02	ND (0.0023)	ND (0.0024)	ND (0.0024)	ND (0.0023)	(0.0023)	ND (0.0023)	ND (0.0024)	ND (0.0023)	ND (0.0024)	ND (0.0024)	ND (0.0022)	ND (0.0022)	-
beta-BHC	ug/l	0.04	ND (0.0032)	ND (0.0034)	ND (0.0034)	ND (0.0032)	(0.0033)	ND (0.0033)	ND (0.0034)	ND (0.0032)	ND (0.0034)	ND (0.0034)	ND (0.0030)	ND (0.0030)	-
delta-BHC	ug/l	-	ND (0.0018)	ND (0.0019)	ND (0.0019)	ND (0.0018)	(0.0018)	ND (0.0018)	ND (0.0019)	ND (0.0018)	ND (0.0019)	ND (0.0019)	ND (0.0017)	ND (0.0017)	-
gamma-BHC (Lindane)	ug/l	0.03	ND (0.0025)	ND (0.0027)	ND (0.0027)	ND (0.0026)	(0.0026)	ND (0.0026)	ND (0.0027)	ND (0.0025)	ND (0.0027)	ND (0.0027)	ND (0.0024)	ND (0.0024)	-
alpha-Chlordane	ug/l	0.5	ND (0.0023)	ND (0.0024)	ND (0.0024)	ND (0.0023)	(0.0023)	ND (0.0023)	ND (0.0024)	ND (0.0023)	ND (0.0024)	ND (0.0024)	ND (0.0022)	ND (0.0022)	-
gamma-Chlordane	ug/l	0.5	ND (0.0054)	ND (0.0057)	ND (0.0057)	ND (0.0055)	(0.0056)	ND (0.0056)	ND (0.0057)	ND (0.0054)	ND (0.0057)	ND (0.0057)	ND (0.0052)	ND (0.0052)	-
Dieldrin	ug/l	0.03	ND (0.0031)	ND (0.0033)	ND (0.0033)	ND (0.0031)	(0.0032)	ND (0.0032)	ND (0.0033)	ND (0.0031)	ND (0.0033)	ND (0.0033)	ND (0.0029)	ND (0.0029)	-
4,4'-DDD	ug/l	0.1	ND (0.0034)	ND (0.0036)	ND (0.0036)	ND (0.0035)	(0.0035)	ND (0.0035)	ND (0.0036)	ND (0.0034)	ND (0.0036)	ND (0.0036)	ND (0.0033)	ND (0.0033)	-
4,4'-DDE	ug/l	0.1	ND (0.0032)	ND (0.0033)	ND (0.0033)	ND (0.0032)	(0.0033)	ND (0.0033)	ND (0.0033)	ND (0.0032)	ND (0.0033)	ND (0.0033)	ND (0.0030)	ND (0.0030)	-
4,4'-DDT	ug/l	0.1	ND (0.0031)	ND (0.0033)	ND (0.0033)	ND (0.0031)	(0.0032)	ND (0.0032)	ND (0.0033)	ND (0.0031)	ND (0.0033)	ND (0.0033)	ND (0.0029)	ND (0.0029)	-
Endrin	ug/l	2	ND (0.0039)	ND (0.0041)	ND (0.0041)	ND (0.0039)	(0.0040)	ND (0.0040)	ND (0.0041)	ND (0.0039)	ND (0.0041)	ND (0.0041)	ND (0.0037)	ND (0.0037)	-
Endosulfan sulfate	ug/l	40	ND (0.0070)	ND (0.0074)	ND (0.0074)	ND (0.0070)	(0.0072)	ND (0.0072)	ND (0.0074)	ND (0.0070)	ND (0.0074)	ND (0.0074)	ND (0.0066)	ND (0.0066)	-
Endrin aldehyde	ug/l	-	ND (0.0076)	ND (0.0080)	ND (0.0080)	ND (0.0076)	(0.0078)	ND (0.0078)	ND (0.0080)	ND (0.0076)	ND (0.0080)	ND (0.0080)	ND (0.0072)	ND (0.0072)	-
Endrin ketone	ug/l	-	ND (0.0064)	ND (0.0067)	ND (0.0067)	ND (0.0064)	(0.0066)	ND (0.0066)	ND (0.0067)	ND (0.0064)	ND (0.0067)	ND (0.0067)	ND (0.0061)	ND (0.0061)	-
Endosulfan-I	ug/l	40	ND (0.0038)	ND (0.0040)	ND (0.0040)	ND (0.0038)	(0.0039)	ND (0.0039)	ND (0.0040)	ND (0.0038)	ND (0.0040)	ND (0.0040)	ND (0.0036)	ND (0.0036)	-
Endosulfan-II	ug/l	40	ND (0.0046)	ND (0.0048)	ND (0.0048)	ND (0.0046)	(0.0047)	ND (0.0047)	ND (0.0048)	ND (0.0046)	ND (0.0048)	ND (0.0048)	ND (0.0043)	ND (0.0043)	-
Heptachlor	ug/l	0.05	ND (0.0070)	ND (0.0074)	ND (0.0074)	ND (0.0071)	(0.0072)	ND (0.0072)	ND (0.0074)	ND (0.0070)	ND (0.0074)	ND (0.0074)	ND (0.0066)	ND (0.0066)	-
Heptachlor epoxide	ug/l	0.2	ND (0.0027)	ND (0.0029)	ND (0.0029)	ND (0.0028)	(0.0028)	ND (0.0028)	ND (0.0029)	ND (0.0027)	ND (0.0029)	ND (0.0029)	ND (0.0026)	ND (0.0026)	-
Methoxychlor	ug/l	40	ND (0.0065)	ND (0.0068)	ND (0.0068)	ND (0.0065)	(0.0067)	ND (0.0067)	ND (0.0068)	ND (0.0065)	ND (0.0068)	ND (0.0068)	ND (0.0061)	ND (0.0061)	-
Toxaphene	ug/l	2	ND (0.26)	ND (0.28)	ND (0.28)	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.28)	ND (0.26)	ND (0.28)	ND (0.28)	ND (0.25)	ND (0.25)	-
GC/LC Semi-volatiles (SW846 8082)														
Aroclor 1016	ug/l	0.5	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.30)	ND (0.34)	ND (0.32)	ND (0.31)	ND (0.33)	ND (0.30)	ND (0.30)	-
Aroclor 1221	ug/l	0.5	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.45)	ND (0.41)	ND (0.46)	ND (0.43)	ND (0.42)	ND (0.46)	ND (0.41)	ND (0.41)	-
Aroclor 1232	ug/l	0.5	ND (0.34)	ND (0.34)	ND (0.34)	ND (0.34)	ND (0.34)	ND (0.31)	ND (0.35)	ND (0.33)	ND (0.32)	ND (0.34)	ND (0.31)	ND (0.31)	-
Aroclor 1242	ug/l	0.5	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.29)	ND (0.27)	ND (0.30)	ND (0.28)	ND (0.28)	ND (0.30)	ND (0.27)	ND (0.27)	-
Aroclor 1248	ug/l	0.5	ND (0.31)	ND (0.31)	ND (0.31)	ND (0.31)	ND (0.30)	ND (0.28)	ND (0.31)	ND (0.29)	ND (0.29)	ND (0.31)	ND (0.28)	ND (0.28)	-
Aroclor 1254	ug/l	0.5	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.18)	ND (0.20)	ND (0.19)	ND (0.18)	ND (0.20)	ND (0.18)	ND (0.18)	-
Aroclor 1260	ug/l	0.5	ND (0.16)	ND (0.16)	ND (0.16)	ND (0.16)	ND (0.15)	ND (0.14)	ND (0.16)	ND (0.15)	ND (0.14)	ND (0.16)	ND (0.14)	ND (0.14)	-
Metals Analysis														
Aluminum	ug/l	200	**177000 [b]**	**46800 [b]**	**269000 [b]**	**78400 [b]**	**299000 [b]**	**20900**	**72000 [b]**	**435000 [b]**	**302000 [b]**	**228000 [b]**	**937000 [b]**	<200	-
Antimony	ug/l	6	**167 [b]**	**18.0 [b]**	**86.0 [b]**	<20 [b]	<60 [b]	<6.0	<12 [b]	<60 [b]	<60 [b]	<60 [b]	**114 [b]**	<6.0	-
Arsenic	ug/l	3	**385 [b]**	**61.6 [b]**	**821 [b]**	**86.0 [b]**	**205 [b]**	**14.8**	<12 [c]	**642 [b]**	**231 [b]**	**206 [b]**	**2370 [c]**	<3.0	-
Barium	ug/l	6000	1420 [b]	684 [b]	**9770 [b]**	<670 [b]	2210 [b]	<200	<400 [b]	5960 [b]	2700 [b]	3540 [b]	**20100 [b]**	<200	-
Beryllium	ug/l	1	**8.5 [b]**	**4.0 [b]**	**19.5 [b]**	**4.0 [b]**	<10 [b]	<1.0	<2.0 [b]	**33.0 [b]**	**14.0 [b]**	<10 [b]	**67.0 [b]**	<1.0	-
Cadmium	ug/l	4	**25.0 [b]**	<6.0 [b]	<15 [b]	<10 [b]	<30 [b]	<3.0	<6.0 [b]	<30 [b]	<30 [b]	<30 [b]	<30 [b]	<3.0	-
Calcium	ug/l	-	47600 [b]	44500 [b]	248000 [b]	41800 [b]	85700 [b]	10600	94000 [b]	145000 [b]	145000 [b]	<50000 [b]	732000 [b]	<5000	-
Chromium	ug/l	70	**2920 [b]**	**1880 [b]**	**543 [b]**	**905 [b]**	**4290 [b]**	67.1	**212 [b]**	**2700 [b]**	**978 [b]**	**829 [b]**	**1840 [b]**	<10	-
Cobalt	ug/l	100	<250 [b]	<100 [b]	<250 [b]	<170 [b]	<500 [b]	<50	<100 [b]	<500 [b]	<500 [b]	<500 [b]	<500 [b]	<50	-
Copper	ug/l	1300	**4640 [b]**	750 [b]	675 [b]	614 [b]	**2200 [b]**	128	488 [b]	**2520 [b]**	**4330 [b]**	**1390 [b]**	**2600 [b]**	<10	-
Iron	ug/l	300	**346000 [b]**	**86000 [b]**	**334000 [b]**	**177000 [b]**	**577000 [b]**	**36100**	**130000 [b]**	**717000 [b]**	**764000 [b]**	**492000 [b]**	**1390000 [b]**	<100	-
Lead	ug/l	5	**9160 [b]**	**727 [b]**	**1300 [b]**	**484 [b]**	**1290 [b]**	**61.8**	**159 [c]**	**5680 [b]**	**2280 [b]**	**1430 [b]**	**4020 [c]**	<3.0	-
Magnesium	ug/l	-	26300 [b]	24400 [b]	528000 [b]	29800 [b]	106000 [b]	6770	55700 [b]	114000 [b]	160000 [b]	85600 [b]	279000 [b]	<5000	-
Manganese	ug/l	50	**2910 [b]**	**1440 [b]**	**1720 [b]**	**1490 [b]**	**6360 [b]**	**262**	**2820 [b]**	**5740 [b]**	**7810 [b]**	**3070 [b]**	**9840 [b]**	<15	-
Mercury	ug/l	2	**13.4**	**2.4 [b]**	1.3 [b]	1.2 [b]	**5.9**	<0.80 [b]	<0.80 [b]	**6.4**	**8.2**	**11.7**	**15**	<0.20	-
Nickel	ug/l	100	**502 [b]**	**234 [b]**	**478 [b]**	**160 [b]**	**765 [b]**	27.4	**138 [b]**	**932 [b]**	**1190 [b]**	**1760 [b]**	**1330 [b]**	<10	-
Potassium	ug/l	-	<50000 [b]	<20000 [b]	103000 [b]	<33000 [b]	<100000 [b]	<10000	<20000 [b]	<100000 [b]	<100000 [b]	<100000 [b]	108000 [b]	<10000	-
Selenium	ug/l	40	**75.0 [b]**	<20 [b]	<50 [b]	<33 [b]	<100 [b]	<10	<20 [b]	<100 [b]	<100 [b]	<100 [b]	<100 [b]	<10	-

Table 3a
Hess Corporation Former Port Reading Terminal
750 Cliff Road, Port Reading, New Jersey
Temporary Well Data - 2009

Silver	ug/l	40	**66.5 [b]**	<20 [b]	<50 [b]	<33 [b]	<100 [b]	<10	<20 [b]	<100 [b]	<100 [b]	<100 [b]	<100 [b]	<10	-
Sodium	ug/l	50000	**142000 [b]**	**84500 [b]**	**2000000 [b]**	42100 [b]	**153000 [b]**	<10000	**55700 [b]**	**187000 [b]**	**218000 [b]**	<100000 [b]	**461000 [b]**	<10000	-
Thallium	ug/l	2	<50 [b]	<20 [b]	24.0 [b]	<34 [b]	<100 [b]	<10	<20 [b]	<100 [b]	<100 [b]	<100 [b]	<100 [b]	<10	-
Vanadium	ug/l	-	1340 [b]	321 [b]	2690 [b]	576 [b]	1420 [b]	141	261 [b]	4220 [b]	1240 [b]	1130 [b]	6160 [b]	<50	-
Zinc	ug/l	2000	**6520 [b]**	**3770 [b]**	820 [b]	1460 [b]	**5320 [b]**	226	533 [b]	**5800 [b]**	**8670 [b]**	1810 [b]	**3560 [b]**	<20	-
General Chemistry															
Cyanide	mg/l	0.1	<0.010	<0.010	<0.010	<0.010	0.039	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-

Footnotes:

[a] Possibly laboratory contamination.

[b] Elevated sample detection limit due to difficult sample matrix.

[c] Elevated detection limit due to dilution required for high interfering element.

Table 3b
Hess Corporation Former Port Reading Terminal
750 Cliff Road, Port Reading, New Jersey
Temporary Well Analytical - September 2010

Client Sample ID:		NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	SLF-TW13	SLF-TW14	SLF-TW15	SLF-TW16	SLF-TW17	SLF-TW18	SLF-TW19	SLF-TW20	SLF-TW21	SLF-TW22
Lab Sample ID:			JA56385-1	JA56385-2	JA56385-3	JA56385-4	JA56385-5	JA56385-6	JA56385-7	JA56385-8	JA56385-9	JA56385-10
Date Sampled:			9/15/2010	9/15/2010	9/15/2010	9/15/2010	9/15/2010	9/15/2010	9/15/2010	9/15/2010	9/15/2010	9/15/2010
Matrix:			Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
MS Volatiles (SW846 8260B)												
Acetone	ug/l	6000	15	ND (2.9)	15	ND (7.2)	ND (2.9)	ND (2.9)	ND (5.7)	ND (2.9)	19.5	ND (7.2)
Benzene	ug/l	1	**4.9**	ND (0.23)	**97**	**153**	**4.7**	**20.2**	**103**	**9.5**	**9.4**	**314**
Bromochloromethane	ug/l	-	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.83)	ND (0.33)	ND (0.33)	ND (0.66)	ND (0.33)	ND (0.33)	ND (0.83)
Bromodichloromethane	ug/l	1	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.55)	ND (0.22)	ND (0.22)	ND (0.44)	ND (0.22)	ND (0.22)	ND (0.55)
Bromoform	ug/l	4	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.58)	ND (0.23)	ND (0.23)	ND (0.46)	ND (0.23)	ND (0.23)	ND (0.58)
Bromomethane	ug/l	10	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.74)	ND (0.30)	ND (0.30)	ND (0.59)	ND (0.30)	ND (0.30)	ND (0.74)
2-Butanone (MEK)	ug/l	300	ND (1.6)	ND (1.6)	ND (1.6)	ND (4.1)	ND (1.6)	ND (1.6)	ND (3.2)	ND (1.6)	ND (1.6)	ND (4.1)
Carbon disulfide	ug/l	700	ND (0.74)	ND (0.74)	ND (0.74)	ND (1.8)	ND (0.74)	ND (0.74)	ND (1.5)	ND (0.74)	ND (0.74)	ND (1.8)
Carbon tetrachloride	ug/l	1	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.64)	ND (0.26)	ND (0.26)	ND (0.51)	ND (0.26)	ND (0.26)	ND (0.64)
Chlorobenzene	ug/l	50	ND (0.39)	ND (0.39)	ND (0.39)	ND (0.97)	ND (0.39)	0.85 J	2.1	0.76 J	0.55 J	12.7
Chloroethane	ug/l	-	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.93)	ND (0.37)	ND (0.37)	ND (0.74)	ND (0.37)	ND (0.37)	ND (0.93)
Chloroform	ug/l	70	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.59)	ND (0.23)	ND (0.23)	ND (0.47)	ND (0.23)	ND (0.23)	ND (0.59)
Chloromethane	ug/l	-	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.72)	ND (0.29)	ND (0.29)	ND (0.58)	ND (0.29)	ND (0.29)	ND (0.72)
Cyclohexane	ug/l	-	8.4	ND (1.9)	28.8	11.9 J	ND (1.9)	14.1	24.4	ND (1.9)	11.6	10.5 J
1,2-Dibromo-3-chloropropane	ug/l	0.02	ND (1.1)	ND (1.1)	ND (1.1)	ND (2.8)	ND (1.1)	ND (1.1)	ND (2.2)	ND (1.1)	ND (1.1)	ND (2.8)
Dibromochloromethane	ug/l	1	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.54)	ND (0.22)	ND (0.22)	ND (0.43)	ND (0.22)	ND (0.22)	ND (0.54)
1,2-Dibromoethane	ug/l	0.03	ND (0.39)	ND (0.39)	ND (0.39)	ND (0.97)	ND (0.39)	ND (0.39)	ND (0.77)	ND (0.39)	ND (0.39)	ND (0.97)
1,2-Dichlorobenzene	ug/l	600	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.65)	ND (0.26)	ND (0.26)	3.2	ND (0.26)	0.72 J	ND (0.65)
1,3-Dichlorobenzene	ug/l	600	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.63)	ND (0.25)	ND (0.25)	ND (0.51)	ND (0.25)	ND (0.25)	ND (0.63)
1,4-Dichlorobenzene	ug/l	75	ND (0.28)	ND (0.28)	ND (0.28)	ND (0.69)	ND (0.28)	ND (0.28)	ND (0.55)	ND (0.28)	ND (0.28)	ND (0.69)
Dichlorodifluoromethane	ug/l	1000	ND (0.92)	ND (0.92)	ND (0.92)	ND (2.3)	ND (0.92)	ND (0.92)	ND (1.8)	ND (0.92)	ND (0.92)	ND (2.3)
1,1-Dichloroethane	ug/l	50	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.72)	ND (0.29)	ND (0.29)	ND (0.57)	ND (0.29)	ND (0.29)	ND (0.72)
1,2-Dichloroethane	ug/l	2	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.83)	ND (0.33)	ND (0.33)	ND (0.67)	ND (0.33)	ND (0.33)	ND (0.83)
1,1-Dichloroethene	ug/l	1	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.99)	ND (0.40)	ND (0.40)	ND (0.79)	ND (0.40)	ND (0.40)	ND (0.99)
cis-1,2-Dichloroethene	ug/l	70	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.54)	ND (0.22)	ND (0.22)	ND (0.43)	ND (0.22)	ND (0.22)	ND (0.54)
trans-1,2-Dichloroethene	ug/l	100	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.62)	ND (0.25)	ND (0.25)	ND (0.50)	ND (0.25)	ND (0.25)	ND (0.62)
1,2-Dichloropropane	ug/l	1	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.68)	ND (0.27)	ND (0.27)	ND (0.55)	ND (0.27)	ND (0.27)	ND (0.68)
cis-1,3-Dichloropropene	ug/l	1	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.62)	ND (0.25)	ND (0.25)	ND (0.50)	ND (0.25)	ND (0.25)	ND (0.62)
trans-1,3-Dichloropropene	ug/l	1	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.53)	ND (0.21)	ND (0.21)	ND (0.43)	ND (0.21)	ND (0.21)	ND (0.53)
1,4-Dioxane	ug/l	0.4	ND (94)	ND (94)	ND (94)	ND (230)	ND (94)	ND (94)	ND (190)	ND (94)	ND (94)	ND (230)
Ethylbenzene	ug/l	700	11.7	0.74 J	87.9	7.9	5.6	47.9	125	4.6	28.8	65.1
Freon 113	ug/l	20000	ND (0.38)	ND (0.38)	ND (0.38)	ND (0.96)	ND (0.38)	ND (0.38)	ND (0.77)	ND (0.38)	ND (0.38)	ND (0.96)
2-Hexanone	ug/l	40	ND (1.4)	ND (1.4)	ND (1.4)	ND (3.5)	ND (1.4)	ND (1.4)	ND (2.8)	ND (1.4)	ND (1.4)	ND (3.5)
Isopropylbenzene	ug/l	700	5.2	ND (0.57)	9.6	4.8 J	0.99 J	5.6	16.2	3.4	8.6	42.8
Methyl Acetate	ug/l	7000	ND (1.5)	ND (1.5)	ND (1.5)	ND (3.8)	ND (1.5)	ND (1.5)	ND (3.0)	ND (1.5)	ND (1.5)	ND (3.8)
Methylcyclohexane	ug/l	-	25.4	1.9 J	48.7	14.5	4.7 J	22.1	55.5	0.60 J	14.9	11.2 J
Methyl Tert Butyl Ether	ug/l	70	0.82 J	ND (0.23)	3.7	1.0 J	ND (0.23)	1	ND (0.47)	ND (0.23)	13.4	1.1 J
4-Methyl-2-pentanone(MIBK)	ug/l	-	ND (0.86)	ND (0.86)	ND (0.86)	ND (2.1)	ND (0.86)	ND (0.86)	ND (1.7)	ND (0.86)	ND (0.86)	ND (2.1)
Methylene chloride	ug/l	3	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.76)	ND (0.30)	ND (0.30)	ND (0.61)	ND (0.30)	ND (0.30)	ND (0.76)
Styrene	ug/l	100	ND (0.58)	ND (0.58)	ND (0.58)	ND (1.4)	ND (0.58)	ND (0.58)	ND (1.2)	ND (0.58)	ND (0.58)	ND (1.4)
Tert Butyl Alcohol	ug/l	100	18.7 J	ND (2.0)	25.4	**318**	ND (2.0)	17.6 J	ND (3.9)	ND (2.0)	**926**	**393**
1,1,2,2-Tetrachloroethane	ug/l	1	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.60)	ND (0.24)	ND (0.24)	ND (0.48)	ND (0.24)	ND (0.24)	ND (0.60)
Tetrachloroethene	ug/l	1	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.66)	ND (0.27)	ND (0.27)	ND (0.53)	ND (0.27)	ND (0.27)	ND (0.66)
Toluene	ug/l	600	0.36 J	ND (0.30)	25.1	4	1.1	1.6	19.9	1.4	1.6	2.8
1,2,3-Trichlorobenzene	ug/l	-	ND (0.47)	ND (0.47)	ND (0.47)	ND (1.2)	ND (0.47)	ND (0.47)	ND (0.94)	ND (0.47)	ND (0.47)	ND (1.2)
1,2,4-Trichlorobenzene	ug/l	9	ND (0.56)	ND (0.56)	ND (0.56)	ND (1.4)	ND (0.56)	ND (0.56)	ND (1.1)	ND (0.56)	ND (0.56)	ND (1.4)
1,1,1-Trichloroethane	ug/l	30	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.64)	ND (0.26)	ND (0.26)	ND (0.51)	ND (0.26)	ND (0.26)	ND (0.64)
1,1,2-Trichloroethane	ug/l	3	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.58)	ND (0.23)	ND (0.23)	ND (0.46)	ND (0.23)	ND (0.23)	ND (0.58)
Trichloroethene	ug/l	1	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.60)	ND (0.24)	ND (0.24)	ND (0.48)	ND (0.24)	ND (0.24)	ND (0.60)
Trichlorofluoromethane	ug/l	2000	ND (0.54)	ND (0.54)	ND (0.54)	ND (1.3)	ND (0.54)	ND (0.54)	ND (1.1)	ND (0.54)	ND (0.54)	ND (1.3)
Vinyl chloride	ug/l	1	ND (0.44)	ND (0.44)	ND (0.44)	ND (1.1)	ND (0.44)	ND (0.44)	ND (0.89)	ND (0.44)	ND (0.44)	ND (1.1)
m,p-Xylene	ug/l	-	4.1	ND (0.25)	106	9.9	9.5	20.1	383	1.8	12.3	24.4
o-Xylene	ug/l	-	0.32 J	ND (0.25)	16.8	1.4 J	4.5	2.6	44	3.8	1.5	55.3
Xylene (total)	ug/l	1000	4.4	ND (0.25)	123	11.3	14	22.7	427	5.6	13.8	79.7
MS Volatile TIC												
Total TIC, Volatile	ug/l	-	190.1 J	16.7 J	1700 J	1047 J	211.8 J	496 J	1625 J	81.3 J	448 J	708 J
MS Semi-volatiles (SW846 8270C)												
Acenaphthene	ug/l	400	-	-	-	-	-	-	32.1	-	36.8	7
Acetophenone	ug/l	700	ND (0.43)	ND (0.44)	ND (0.40)	ND (0.42)	ND (0.43)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.42)	ND (0.40)
Anthracene	ug/l	2000	-	-	-	-	-	-	18.9	-	16.7	-
Atrazine	ug/l	3	ND (0.42)	ND (0.43)	ND (0.39)	ND (0.41)	ND (0.43)	ND (0.39)	ND (0.39)	ND (0.39)	ND (0.41)	ND (0.39)
Benzaldehyde	ug/l	-	ND (0.43)	ND (0.44)	ND (0.40)	ND (0.42)	ND (0.44)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.42)	ND (0.40)
Benzo(a)anthracene	ug/l	0.1	-	-	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene	ug/l	0.2	-	-	-	-	-	-	-	-	-	-
4-Bromophenyl phenyl ether	ug/l	-	ND (0.38)	ND (0.38)	ND (0.35)	ND (0.36)	ND (0.38)	ND (0.35)	ND (0.35)	ND (0.35)	ND (0.37)	ND (0.35)
Butyl benzyl phthalate	ug/l	100	ND (0.27)	ND (0.27)	ND (0.25)	ND (0.26)	ND (0.27)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.26)	ND (0.25)
1,1'-Biphenyl	ug/l	400	ND (0.45)	ND (0.46)	1.8	ND (0.44)	0.79 J	0.44 J	10.3	0.59 J	ND (0.44)	10.5
2-Chloronaphthalene	ug/l	600	ND (0.45)	ND (0.45)	ND (0.42)	ND (0.43)	ND (0.45)	ND (0.42)	ND (0.42)	ND (0.42)	ND (0.44)	ND (0.42)

Client Sample ID:	SLF-TW-24	SLF-TW-25	SLF-TW-26	SLF-TW-27	SLF-TW-28	SLF-TW-29	SLF-TW-30	SLF-TW-23	SLF-TW-31	SLF-TW-32	SLF-TW33	SLF-TW34
Lab Sample ID:	JA56462-1	JA56462-2	JA56462-3	JA56462-4	JA56462-5	JA56462-6	JA56462-7	JA56462-8	JA56462-9	JA56462-10	JA56620-1	JA56620-2
Date Sampled:	9/16/2010	9/16/2010	9/16/2010	9/16/2010	9/16/2010	9/16/2010	9/16/2010	9/16/2010	9/16/2010	9/16/2010	9/17/2010	9/17/2010
Matrix:	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
MS Volatiles (SW846 8260B)												
Acetone	ND (2.9)	ND (2.9)	ND (29)	15.3	18.8 J	ND (29)	15.1	20.2	ND (14)	27.9	21.2	38.1
Benzene	ND (0.23)	**36.6**	**3.6 J**	**7.7**	**64**	**15.5**	0.38 J	**18.1**	**345**	**3.5**	**3.6**	**28.2**
Bromochloromethane	ND (0.33)	ND (0.33)	ND (3.3)	ND (0.33)	ND (0.83)	ND (3.3)	ND (0.33)	ND (0.33)	ND (1.7)	ND (0.33)	ND (0.33)	ND (0.33)
Bromodichloromethane	ND (0.22)	ND (0.22)	ND (2.2)	ND (0.22)	ND (0.55)	ND (2.2)	ND (0.22)	ND (0.22)	ND (1.1)	ND (0.22)	ND (0.22)	ND (0.22)
Bromoform	ND (0.23)	ND (0.23)	ND (2.3)	ND (0.23)	ND (0.58)	ND (2.3)	ND (0.23)	ND (0.23)	ND (1.2)	ND (0.23)	ND (0.23)	ND (0.23)
Bromomethane	ND (0.30)	ND (0.30)	ND (3.0)	ND (0.30)	ND (0.74)	ND (3.0)	ND (0.30)	ND (0.30)	ND (1.5)	ND (0.30)	ND (0.30)	ND (0.30)
2-Butanone (MEK)	ND (1.6)	ND (1.6)	ND (16)	ND (1.6)	ND (4.1)	ND (16)	ND (1.6)	ND (1.6)	ND (8.1)	ND (1.6)	ND (1.6)	7.1 J
Carbon disulfide	ND (0.74)	ND (0.74)	ND (7.4)	ND (0.74)	ND (1.8)	ND (7.4)	ND (0.74)	ND (0.74)	ND (3.7)	ND (0.74)	ND (0.74)	ND (0.74)
Carbon tetrachloride	ND (0.26)	ND (0.26)	ND (2.6)	ND (0.26)	ND (0.64)	ND (2.6)	ND (0.26)	ND (0.26)	ND (1.3)	ND (0.26)	ND (0.26)	ND (0.26)
Chlorobenzene	ND (0.39)	8.2	ND (3.9)	1.5	ND (0.97)	ND (3.9)	ND (0.39)	0.84 J	15.3	2.9	ND (0.39)	ND (0.39)
Chloroethane	ND (0.37)	ND (0.37)	ND (3.7)	ND (0.37)	ND (0.93)	ND (3.7)	ND (0.37)	ND (0.37)	ND (1.9)	ND (0.37)	ND (0.37)	ND (0.37)
Chloroform	ND (0.23)	ND (0.23)	ND (2.3)	ND (0.23)	ND (0.59)	ND (2.3)	ND (0.23)	ND (0.23)	ND (1.2)	ND (0.23)	ND (0.23)	ND (0.23)
Chloromethane	ND (0.29)	ND (0.29)	ND (2.9)	ND (0.29)	ND (0.72)	ND (2.9)	ND (0.29)	ND (0.29)	ND (1.4)	ND (0.29)	ND (0.29)	ND (0.29)
Cyclohexane	ND (1.9)	13.7	ND (19)	7.4	47	54.4	ND (1.9)	2.3 J	40.4	19	40.3	11.2
1,2-Dibromo-3-chloropropane	ND (1.1)	ND (1.1)	ND (11)	ND (1.1)	ND (2.8)	ND (11)	ND (1.1)	ND (1.1)	ND (5.5)	ND (1.1)	ND (1.1)	ND (1.1)
Dibromochloromethane	ND (0.22)	ND (0.22)	ND (2.2)	ND (0.22)	ND (0.54)	ND (2.2)	ND (0.22)	ND (0.22)	ND (1.1)	ND (0.22)	ND (0.22)	ND (0.22)
1,2-Dibromoethane	ND (0.39)	ND (0.39)	ND (3.9)	ND (0.39)	ND (0.97)	ND (3.9)	ND (0.39)	ND (0.39)	ND (1.9)	ND (0.39)	ND (0.39)	ND (0.39)
1,2-Dichlorobenzene	ND (0.26)	ND (0.26)	ND (2.6)	0.50 J	ND (0.65)	ND (2.6)	ND (0.26)	4.5	77.2	0.86 J	ND (0.26)	ND (0.26)
1,3-Dichlorobenzene	ND (0.25)	ND (0.25)	ND (2.5)	ND (0.25)	ND (0.63)	ND (2.5)	ND (0.25)	0.31 J	ND (1.3)	ND (0.25)	ND (0.25)	ND (0.25)
1,4-Dichlorobenzene	ND (0.28)	ND (0.28)	ND (2.8)	ND (0.28)	ND (0.69)	ND (2.8)	ND (0.28)	1.4	4.4 J	ND (0.28)	ND (0.28)	ND (0.28)
Dichlorodifluoromethane	ND (0.92)	ND (0.92)	ND (9.2)	ND (0.92)	ND (2.3)	ND (9.2)	ND (0.92)	ND (0.92)	ND (4.6)	ND (0.92)	ND (0.92)	ND (0.92)
1,1-Dichloroethane	ND (0.29)	ND (0.29)	ND (2.9)	ND (0.29)	ND (0.72)	ND (2.9)	ND (0.29)	ND (0.29)	ND (1.4)	ND (0.29)	ND (0.29)	ND (0.29)
1,2-Dichloroethane	ND (0.33)	ND (0.33)	ND (3.3)	ND (0.33)	ND (0.83)	ND (3.3)	ND (0.33)	ND (0.33)	ND (1.7)	ND (0.33)	ND (0.33)	ND (0.33)
1,1-Dichloroethene	ND (0.40)	ND (0.40)	ND (4.0)	ND (0.40)	ND (0.99)	ND (4.0)	ND (0.40)	ND (0.40)	ND (2.0)	ND (0.40)	ND (0.40)	ND (0.40)
cis-1,2-Dichloroethene	ND (0.22)	ND (0.22)	ND (2.2)	ND (0.22)	ND (0.54)	ND (2.2)	ND (0.22)	10.3	**894**	0.51 J	ND (0.22)	ND (0.22)
trans-1,2-Dichloroethene	ND (0.25)	ND (0.25)	ND (2.5)	ND (0.25)	ND (0.62)	ND (2.5)	ND (0.25)	ND (0.25)	7.9	ND (0.25)	ND (0.25)	ND (0.25)
1,2-Dichloropropane	ND (0.27)	ND (0.27)	ND (2.7)	ND (0.27)	ND (0.68)	ND (2.7)	ND (0.27)	ND (0.27)	ND (1.4)	ND (0.27)	ND (0.27)	ND (0.27)
cis-1,3-Dichloropropene	ND (0.25)	ND (0.25)	ND (2.5)	ND (0.25)	ND (0.62)	ND (2.5)	ND (0.25)	ND (0.25)	ND (1.2)	ND (0.25)	ND (0.25)	ND (0.25)
trans-1,3-Dichloropropene	ND (0.21)	ND (0.21)	ND (2.1)	ND (0.21)	ND (0.53)	ND (2.1)	ND (0.21)	ND (0.21)	ND (1.1)	ND (0.21)	ND (0.21)	ND (0.21)
1,4-Dioxane	ND (94)	ND (94)	ND (940)	ND (94)	ND (230)	ND (940)	ND (94)	ND (94)	ND (470)	ND (94)	ND (94)	ND (94)
Ethylbenzene	ND (0.27)	11.2	4.0 J	11	9.6	4.4 J	ND (0.27)	10.8	61.2	ND (0.27)	1.3	1.3
Freon 113	ND (0.38)	ND (0.38)	ND (3.8)	ND (0.38)	ND (0.96)	ND (3.8)	ND (0.38)	ND (0.38)	ND (1.9)	ND (0.38)	ND (0.38)	ND (0.38)
2-Hexanone	ND (1.4)	ND (1.4)	ND (14)	ND (1.4)	ND (3.5)	ND (14)	ND (1.4)	ND (1.4)	ND (7.0)	ND (1.4)	ND (1.4)	ND (1.4)
Isopropylbenzene	ND (0.57)	7.2	ND (5.7)	6.2	41.7	21.5	ND (0.57)	5	10.8	9.5	17.6	24.2
Methyl Acetate	ND (1.5)	ND (1.5)	ND (15)	ND (1.5)	ND (3.8)	ND (15)	ND (1.5)	ND (1.5)	ND (7.5)	ND (1.5)	ND (1.5)	ND (1.5)
Methylcyclohexane	ND (0.35)	20.9	ND (3.5)	9.1	50.7	40.4 J	0.87 J	3.0 J	47.3	23.4	65.4	89.2
Methyl Tert Butyl Ether	ND (0.23)	15.5	ND (2.3)	ND (0.23)	5	ND (2.3)	3.2	7.5	1.5 J	7.9	ND (0.23)	5.3
4-Methyl-2-pentanone(MIBK)	ND (0.86)	ND (0.86)	ND (8.6)	ND (0.86)	ND (2.1)	ND (8.6)	ND (0.86)	ND (0.86)	ND (4.3)	ND (0.86)	ND (0.86)	ND (0.86)
Methylene chloride	ND (0.30)	ND (0.30)	ND (3.0)	ND (0.30)	ND (0.76)	ND (3.0)	ND (0.30)	0.70 J	ND (1.5)	ND (0.30)	ND (0.30)	ND (0.30)
Styrene	ND (0.58)	ND (0.58)	ND (5.8)	ND (0.58)	ND (1.4)	ND (5.8)	ND (0.58)	ND (0.58)	ND (2.9)	ND (0.58)	ND (0.58)	ND (0.58)
Tert Butyl Alcohol	ND (2.0)	ND (2.0)	ND (20)	ND (2.0)	ND (4.9)	ND (20)	ND (2.0)	**388**	**1180**	**494**	ND (2.0)	ND (2.0)
1,1,2,2-Tetrachloroethane	ND (0.24)	ND (0.24)	ND (2.4)	ND (0.24)	ND (0.60)	ND (2.4)	ND (0.24)	ND (0.24)	ND (1.2)	ND (0.24)	ND (0.24)	ND (0.24)
Tetrachloroethene	ND (0.27)	ND (0.27)	ND (2.7)	ND (0.27)	ND (0.66)	ND (2.7)	ND (0.27)	**11.9**	ND (1.3)	ND (0.27)	ND (0.27)	ND (0.27)
Toluene	ND (0.30)	1.1	ND (3.0)	0.92 J	4.8	ND (3.0)	ND (0.30)	8.2	14.3	0.46 J	1.3	1.6
1,2,3-Trichlorobenzene	ND (0.47)	ND (0.47)	ND (4.7)	ND (0.47)	ND (1.2)	ND (4.7)	ND (0.47)	ND (0.47)	ND (2.3)	ND (0.47)	ND (0.47)	ND (0.47)
1,2,4-Trichlorobenzene	ND (0.56)	ND (0.56)	ND (5.6)	ND (0.56)	ND (1.4)	ND (5.6)	ND (0.56)	1.4 J	2.8 J	ND (0.56)	ND (0.56)	ND (0.56)
1,1,1-Trichloroethane	ND (0.26)	ND (0.26)	ND (2.6)	ND (0.26)	ND (0.64)	ND (2.6)	ND (0.26)	ND (0.26)	ND (1.3)	ND (0.26)	ND (0.26)	ND (0.26)
1,1,2-Trichloroethane	ND (0.23)	ND (0.23)	ND (2.3)	ND (0.23)	ND (0.58)	ND (2.3)	ND (0.23)	ND (0.23)	ND (1.2)	ND (0.23)	ND (0.23)	ND (0.23)
Trichloroethene	ND (0.24)	ND (0.24)	ND (2.4)	ND (0.24)	ND (0.60)	**5.0 J**	ND (0.24)	**9.5**	ND (1.2)	ND (0.24)	ND (0.24)	ND (0.24)
Trichlorofluoromethane	ND (0.54)	ND (0.54)	ND (5.4)	ND (0.54)	ND (1.3)	ND (5.4)	ND (0.54)	ND (0.54)	ND (2.7)	ND (0.54)	ND (0.54)	ND (0.54)
Vinyl chloride	ND (0.44)	ND (0.44)	ND (4.4)	ND (0.44)	ND (1.1)	ND (4.4)	ND (0.44)	**4.2**	**279**	ND (0.44)	ND (0.44)	ND (0.44)
m,p-Xylene	ND (0.25)	2	ND (2.5)	3.8	9.7	6.2 J	0.71 J	11.9	96.6	ND (0.25)	1	1.8
o-Xylene	ND (0.25)	8.6	ND (2.5)	14.6	2.1 J	4.4 J	ND (0.25)	10	19.1	0.75 J	0.86 J	0.26 J
Xylene (total)	ND (0.25)	10.5	ND (2.5)	18.4	11.8	10.6	0.71 J	21.9	116	0.75 J	1.9	2.1
MS Volatile TIC												
Total TIC, Volatile	0	591 J	0	204.2 J	2166 J	9720 J	35.2 J	137.7 J	752 J	582 J	1209 J	1378 J
MS Semi-volatiles (SW846 8270C)												
Acenaphthene	-	4	-	20.5	17.2	63.8	-	9.1	24.3	10.6	7.5	-
Acetophenone	ND (0.40)	ND (0.42)	ND (0.45)	ND (0.61)	ND (0.40)	ND (0.40)	ND (4.0)	ND (0.40)	ND (0.40)	ND (0.43)	ND (0.46)	ND (0.40)
Anthracene	-	-	-	-	-	16.5	-	-	20.8	-	-	-
Atrazine	ND (0.39)	ND (0.41)	ND (0.44)	ND (0.60)	ND (0.39)	ND (0.39)	ND (3.9)	ND (0.39)	ND (0.39)	ND (0.42)	ND (0.45)	ND (0.39)
Benzaldehyde	ND (0.40)	ND (0.43)	ND (0.46)	ND (0.62)	ND (0.40)	ND (0.40)	ND (4.0)	ND (0.40)	ND (0.40)	ND (0.43)	ND (0.46)	ND (0.40)
Benzo(a)anthracene	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromophenyl phenyl ether	ND (0.35)	ND (0.37)	ND (0.40)	ND (0.54)	ND (0.35)	ND (0.35)	ND (3.5)	ND (0.35)	ND (0.35)	ND (0.38)	ND (0.40)	ND (0.35)
Butyl benzyl phthalate	ND (0.25)	ND (0.27)	ND (0.29)	ND (0.39)	ND (0.25)	ND (0.25)	ND (2.5)	ND (0.25)	ND (0.25)	ND (0.27)	ND (0.29)	ND (0.25)
1,1'-Biphenyl	ND (0.42)	ND (0.45)	ND (0.48)	0.91 J	ND (0.42)	ND (0.42)	ND (4.2)	1.8	4.6	ND (0.45)	ND (0.48)	ND (0.42)
2-Chloronaphthalene	ND (0.42)	ND (0.44)	ND (0.47)	ND (0.64)	4.5	ND (0.42)	ND (4.2)	ND (0.42)	ND (0.42)	ND (0.45)	ND (0.48)	ND (0.42)

Table 3b
Hess Corporation Former Port Reading Terminal
750 Cliff Road, Port Reading, New Jersey
Temporary Well Analytical - September 2010

4-Chloroaniline	ug/l	30	ND (0.27)	ND (0.28)	ND (0.25)	ND (0.26)	ND (0.28)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.26)	ND (0.25)	ND (0.25)	ND (0.27)	ND (0.29)	ND (0.39)	ND (0.25)	ND (0.25)	ND (2.5)	ND (0.25)	ND (0.25)	ND (0.27)	ND (0.29)	ND (0.25)
Carbazole	ug/l	-	ND (0.18)	ND (0.18)	ND (0.17)	1.6	ND (0.18)	0.55 J	ND (0.17)	ND (0.17)	ND (0.17)	0.80 J	ND (0.17)	1.7	0.64 J	18.5	6.2	41.2	ND (1.7)	8.3	ND (0.17)	ND (0.18)	ND (0.19)	0.91 J
Caprolactam	ug/l	4000	ND (0.21)	ND (0.21)	ND (0.20)	ND (0.20)	ND (0.21)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.21)	ND (0.22)	5.6	ND (0.20)	ND (0.20)	ND (2.0)	5.6	ND (0.20)	ND (0.21)	ND (0.22)	ND (0.20)
Chrysene	ug/l	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**9.3**	-	-	-
bis(2-Chloroethoxy)methane	ug/l	-	ND (0.27)	ND (0.27)	ND (0.25)	ND (0.26)	ND (0.27)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.26)	ND (0.25)	ND (0.25)	ND (0.26)	ND (0.28)	ND (0.38)	ND (0.25)	ND (0.25)	ND (2.5)	ND (0.25)	ND (0.25)	ND (0.27)	ND (0.29)	ND (0.25)
bis(2-Chloroethyl)ether	ug/l	7	ND (0.33)	ND (0.34)	ND (0.31)	ND (0.32)	ND (0.34)	ND (0.31)	ND (0.31)	ND (0.31)	ND (0.32)	ND (0.31)	ND (0.31)	ND (0.33)	ND (0.35)	ND (0.48)	ND (0.31)	ND (0.31)	ND (3.1)	ND (0.31)	ND (0.31)	ND (0.33)	ND (0.36)	ND (0.31)
2,2'-Oxybis(1-chloropropane)	ug/l	300	ND (0.42)	ND (0.43)	ND (0.39)	ND (0.41)	ND (0.42)	ND (0.39)	ND (0.39)	ND (0.39)	ND (0.41)	ND (0.39)	ND (0.39)	ND (0.41)	ND (0.44)	ND (0.60)	ND (0.39)	ND (0.39)	ND (3.9)	ND (0.39)	ND (0.39)	ND (0.42)	ND (0.45)	ND (0.39)
4-Chlorophenyl phenyl ether	ug/l	-	ND (0.38)	ND (0.39)	ND (0.35)	ND (0.37)	ND (0.38)	ND (0.35)	ND (0.35)	ND (0.35)	ND (0.37)	ND (0.35)	ND (0.35)	ND (0.37)	ND (0.40)	ND (0.54)	ND (0.35)	8	ND (3.5)	ND (0.35)	ND (0.35)	ND (0.38)	ND (0.41)	ND (0.35)
2,4-Dinitrotoluene	ug/l	10	ND (0.24)	ND (0.24)	ND (0.22)	ND (0.23)	ND (0.24)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.23)	ND (0.22)	ND (0.22)	ND (0.23)	ND (0.25)	ND (0.34)	ND (0.22)	ND (0.22)	ND (2.2)	ND (0.22)	ND (0.22)	ND (0.24)	ND (0.25)	ND (0.22)
2,6-Dinitrotoluene	ug/l	10	ND (0.35)	ND (0.36)	ND (0.33)	ND (0.34)	ND (0.35)	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.34)	ND (0.33)	ND (0.33)	ND (0.34)	ND (0.37)	ND (0.50)	ND (0.33)	ND (0.33)	ND (3.3)	ND (0.33)	ND (0.33)	ND (0.35)	ND (0.37)	ND (0.33)
3,3'-Dichlorobenzidine	ug/l	30	ND (0.32)	ND (0.32)	ND (0.30)	ND (0.31)	ND (0.32)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.31)	ND (0.30)	ND (0.30)	ND (0.31)	ND (0.34)	ND (0.45)	ND (0.30)	ND (0.30)	ND (3.0)	ND (0.30)	ND (0.30)	ND (0.32)	ND (0.34)	ND (0.30)
Dibenzofuran	ug/l	-	0.63 J	ND (0.33)	2.8 J	0.81 J	0.83 J	0.85 J	ND (0.30)	ND (0.30)	ND (0.32)	1.4 J	ND (0.30)	1.6 J	1.6 J	10.5	ND (0.30)	23.8	ND (3.0)	5	ND (0.30)	ND (0.33)	ND (0.35)	2.2 J
Di-n-butyl phthalate	ug/l	700	ND (0.21)	ND (0.21)	ND (0.19)	ND (0.20)	ND (0.21)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.20)	ND (0.19)	ND (0.19)	ND (0.20)	ND (0.22)	ND (0.29)	ND (0.19)	ND (0.19)	ND (1.9)	ND (0.19)	ND (0.19)	ND (0.21)	ND (0.22)	ND (0.19)
Di-n-octyl phthalate	ug/l	100	ND (0.42)	ND (0.43)	ND (0.40)	ND (0.41)	ND (0.43)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.41)	ND (0.40)	ND (0.40)	ND (0.42)	ND (0.45)	ND (0.61)	ND (0.40)	ND (0.40)	ND (4.0)	ND (0.40)	ND (0.40)	ND (0.42)	ND (0.45)	ND (0.40)
Diethyl phthalate	ug/l	6000	ND (0.18)	ND (0.18)	ND (0.17)	ND (0.17)	ND (0.18)	ND (0.17)	ND (0.17)	ND (0.17)	ND (0.17)	ND (0.17)	ND (0.17)	ND (0.17)	ND (0.19)	ND (0.25)	ND (0.17)	ND (0.17)	ND (1.7)	ND (0.17)	ND (0.17)	ND (0.18)	ND (0.19)	ND (0.17)
Dimethyl phthalate	ug/l	-	ND (0.24)	ND (0.25)	ND (0.23)	ND (0.23)	ND (0.24)	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.24)	ND (0.23)	ND (0.23)	ND (0.24)	ND (0.26)	ND (0.35)	ND (0.23)	ND (0.23)	ND (2.3)	ND (0.23)	ND (0.23)	ND (0.24)	ND (0.26)	ND (0.23)
bis(2-Ethylhexyl)phthalate	ug/l	3	ND (0.35)	1.2 J	ND (0.33)	ND (0.34)	ND (0.36)	ND (0.33)	1.8 J	ND (0.33)	**11.3**	ND (0.33)	ND (0.33)	ND (0.35)	ND (0.37)	ND (0.50)	ND (0.33)	**3.1**	**12.0 J**	1.4 J	**23.6**	**4.3**	**3.3**	1.3 J
Fluoranthene	ug/l	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.2	-	-	-
Fluorene	ug/l	300	-	-	9.9	-	-	-	53.8	-	62.4	7.2	-	5.5	-	16.4	33.9	36.3	-	7.9	48.8	16.9	9	-
Hexachlorobutadiene	ug/l	1	ND (0.14)	ND (0.14)	ND (0.13)	ND (0.13)	ND (0.14)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.14)	ND (0.20)	ND (0.13)	ND (0.13)	ND (1.3)	ND (0.13)	ND (0.13)	ND (0.14)	ND (0.15)	ND (0.13)
Hexachlorocyclopentadiene	ug/l	40	ND (0.26)	ND (0.27)	ND (0.24)	ND (0.25)	ND (0.27)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.26)	ND (0.24)	ND (0.24)	ND (0.26)	ND (0.28)	ND (0.38)	ND (0.24)	ND (0.24)	ND (2.4)	ND (0.24)	ND (0.24)	ND (0.26)	ND (0.28)	ND (0.24)
Hexachloroethane	ug/l	7	ND (0.22)	ND (0.23)	ND (0.21)	ND (0.22)	ND (0.23)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.22)	ND (0.21)	ND (0.21)	ND (0.22)	ND (0.24)	ND (0.32)	ND (0.21)	ND (0.21)	ND (2.1)	ND (0.21)	ND (0.21)	ND (0.22)	ND (0.24)	ND (0.21)
Isophorone	ug/l	40	ND (0.27)	ND (0.27)	ND (0.25)	ND (0.26)	ND (0.27)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.26)	ND (0.25)	ND (0.25)	ND (0.26)	ND (0.28)	ND (0.38)	ND (0.25)	ND (0.25)	ND (2.5)	ND (0.25)	ND (0.25)	ND (0.27)	ND (0.29)	ND (0.25)
2-Methylnaphthalene	ug/l	30	**30.8**	5.5	**122**	**33.9**	24.6	**42.7**	**614**	1	**725**	**43.9**	1.7	**74.7**	4.9	19	**959**	28.5	ND (6.6)	23.7	**241**	**200**	**193**	**197**
2-Nitroaniline	ug/l	-	ND (0.25)	ND (0.26)	ND (0.24)	ND (0.24)	ND (0.26)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.25)	ND (0.24)	ND (0.24)	ND (0.25)	ND (0.27)	ND (0.36)	ND (0.24)	ND (0.24)	ND (2.4)	ND (0.24)	ND (0.24)	ND (0.25)	ND (0.27)	ND (0.24)
3-Nitroaniline	ug/l	-	ND (0.31)	ND (0.31)	ND (0.29)	ND (0.30)	ND (0.31)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.30)	ND (0.29)	ND (0.29)	ND (0.30)	ND (0.33)	ND (0.44)	ND (0.29)	ND (0.29)	ND (2.9)	ND (0.29)	ND (0.29)	ND (0.31)	ND (0.33)	ND (0.29)
4-Nitroaniline	ug/l	-	ND (0.19)	ND (0.19)	ND (0.18)	ND (0.19)	ND (0.19)	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.19)	ND (0.18)	ND (0.18)	ND (0.19)	ND (0.20)	ND (0.27)	ND (0.18)	ND (0.18)	ND (1.8)	ND (0.18)	ND (0.18)	ND (0.19)	ND (0.20)	ND (0.18)
Naphthalene	ug/l	300	31	-	73.7	6.6	23.7	45.3	286	12.5	219	231	-	148	6.3	49.1	**433**	24.1	-	66.6	83.8	-	17.6	6.1
Nitrobenzene	ug/l	6	ND (0.27)	ND (0.28)	ND (0.25)	ND (0.26)	ND (0.28)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.26)	ND (0.25)	ND (0.25)	ND (0.27)	ND (0.29)	ND (0.39)	ND (0.25)	ND (0.25)	ND (2.5)	ND (0.25)	ND (0.25)	ND (0.27)	ND (0.29)	ND (0.25)
N-Nitroso-di-n-propylamine	ug/l	10	ND (0.47)	ND (0.48)	ND (0.44)	ND (0.46)	ND (0.48)	ND (0.44)	ND (0.44)	ND (0.44)	ND (0.46)	ND (0.44)	ND (0.44)	ND (0.46)	ND (0.50)	ND (0.67)	ND (0.44)	ND (0.44)	ND (4.4)	ND (0.44)	ND (0.44)	ND (0.47)	ND (0.50)	ND (0.44)
N-Nitrosodiphenylamine	ug/l	10	ND (0.23)	ND (0.23)	ND (0.22)	ND (0.22)	ND (0.23)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.23)	ND (0.22)	ND (0.22)	ND (0.23)	ND (0.24)	ND (0.33)	ND (0.22)	ND (0.22)	ND (2.2)	ND (0.22)	ND (0.22)	ND (0.23)	ND (0.25)	ND (0.22)
Phenanthrene	ug/l	-	-	-	26.7	-	5.4	-	164	-	213	13.6	-	17.4	8.9	29.8	82.3	100	-	17.5	149	65.4	10	5.3
Pyrene	ug/l	200	-	-	-	-	-	-	11.5	-	16.6	-	-	-	-	-	-	-	-	-	23.1	-	-	-
1,2,4,5-Tetrachlorobenzene	ug/l	-	ND (0.52)	ND (0.53)	ND (0.48)	ND (0.50)	ND (0.53)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.51)	ND (0.48)	ND (0.48)	ND (0.51)	ND (0.55)	ND (0.74)	ND (0.48)	ND (0.48)	ND (4.8)	ND (0.48)	ND (0.48)	ND (0.52)	ND (0.56)	ND (0.48)
MS Semi-volatiles (SW846 8270C BY SIM)																								
Acenaphthene	ug/l	400	1.37	0.616	3.03	1.7	5.13	3.57	-	1.33	-	-	0.448	-	5.58	-	-	-	2.11	-	-	-	-	4.44
Acenaphthylene	ug/l	-	ND (0.042)	ND (0.043)	ND (0.039)	ND (0.041)	ND (0.043)	ND (0.039)	ND (0.039)	ND (0.039)	ND (0.041)	ND (0.039)	ND (0.039)	ND (0.042)	ND (0.045)	0.646	ND (0.039)	ND (0.039)	ND (0.39)	ND (0.039)	ND (0.039)	ND (0.042)	ND (0.045)	ND (0.039)
Anthracene	ug/l	2000	ND (0.028)	0.23	1.75	ND (0.027)	0.982	0.605	-	0.29	-	2.42	ND (0.026)	1.52	1.34	4.19	1.79	-	ND (0.26)	2.56	-	4.44	0.416	0.379
Benzo(a)anthracene	ug/l	0.1	ND (0.025)	ND (0.026)	**2.82**	ND (0.025)	**0.199**	**0.134**	**2.19**	ND (0.024)	**2.9**	**0.704**	ND (0.024)	**2.27**	**0.334**	**0.953**	**0.304**	**0.755**	ND (0.24)	**0.316**	**4.07**	**1.42**	**0.339**	ND (0.024)
Benzo(a)pyrene	ug/l	0.1	ND (0.033)	ND (0.034)	**1.94**	ND (0.032)	ND (0.033)	ND (0.031)	**2.16**	ND (0.031)	**2.33**	**0.41**	ND (0.031)	**1.22**	ND (0.035)	**0.329**	**0.169**	**0.424**	ND (0.31)	ND (0.031)	**3.54**	**0.593**	ND (0.035)	ND (0.031)
Benzo(b)fluoranthene	ug/l	0.2	ND (0.038)	ND (0.039)	**1.07**	ND (0.037)	ND (0.039)	ND (0.036)	**0.958**	ND (0.036)	**1.99**	**0.251**	ND (0.036)	**0.7**	ND (0.041)	ND (0.055)	0.15	**0.78**	ND (0.36)	ND (0.036)	**3.56**	**0.539**	ND (0.041)	ND (0.036)
Benzo(g,h,i)perylene	ug/l	-	ND (0.031)	ND (0.031)	0.501	ND (0.030)	ND (0.031)	ND (0.029)	0.69	ND (0.029)	0.964	0.134	ND (0.029)	0.266	ND (0.033)	ND (0.044)	ND (0.029)	0.25	ND (0.29)	ND (0.029)	1.54	0.348	ND (0.033)	ND (0.029)
Benzo(k)fluoranthene	ug/l	0.5	ND (0.030)	ND (0.031)	0.475	ND (0.029)	ND (0.031)	ND (0.028)	**1.53**	ND (0.028)	**1.16**	0.0936 J	ND (0.028)	0.116	ND (0.032)	ND (0.043)	0.0728 J	0.221	ND (0.28)	ND (0.028)	**2.32**	0.388	ND (0.032)	ND (0.028)
Chrysene	ug/l	5	ND (0.024)	ND (0.024)	4.61	ND (0.023)	0.317	0.22	2.74	ND (0.022)	4.71	0.781	ND (0.022)	3.51	0.368	1.09	0.442	1.13	ND (0.22)	0.58	-	2.93	0.182	ND (0.022)
Dibenzo(a,h)anthracene	ug/l	0.3	ND (0.024)	ND (0.025)	**0.416**	ND (0.023)	ND (0.024)	ND (0.023)	**0.44**	ND (0.023)	**0.72**	ND (0.023)	ND (0.023)	0.169	ND (0.026)	ND (0.035)	ND (0.023)	0.108	ND (0.23)	ND (0.023)	**0.55**	0.133	ND (0.026)	ND (0.023)
Fluoranthene	ug/l	300	ND (0.026)	ND (0.027)	1.21	ND (0.025)	0.347	0.249	2.48	0.136	3.52	1.17	ND (0.024)	1.11	1.91	6.68	0.836	3.84	ND (0.24)	1.56	-	1.6	0.308	0.144
Fluorene	ug/l	300	1.84	1.13	-	2.25	4.7	3.25	-	0.986	-	-	0.382	-	5.47	-	-	-	1.77	-	-	-	-	4.63
Hexachlorobenzene	ug/l	0.02	ND (0.011)	ND (0.011)	ND (0.0099)	ND (0.010)	ND (0.011)	ND (0.0099)	ND (0.0099)	ND (0.0099)	ND (0.010)	ND (0.0099)	ND (0.0099)	ND (0.010)	ND (0.011)	ND (0.015)	ND (0.0099)	ND (0.0099)	ND (0.099)	ND (0.0099)	ND (0.0099)	ND (0.011)	ND (0.011)	ND (0.0099)
Indeno(1,2,3-cd)pyrene	ug/l	0.2	ND (0.031)	ND (0.032)	**0.258**	ND (0.030)	ND (0.032)	ND (0.029)	**0.335**	ND (0.029)	**0.422**	ND (0.029)	ND (0.029)	0.14	ND (0.033)	ND (0.045)	ND (0.029)	**0.228**	ND (0.29)	ND (0.029)	**1.31**	**0.251**	ND (0.034)	ND (0.029)
Naphthalene	ug/l	300	-	2.2	-	-	-	-	-	-	-	-	0.21	-	5.59	-	-	-	1.24	-	-	ND (0.020)	-	-
Phenanthrene	ug/l	-	1.92	1.97	-	2.44	-	4.68	-	1.08	-	-	0.342	-	-	-	-	-	2.56	-	-	-	-	-
Pyrene	ug/l	200	0.14	0.203	4.35	ND (0.023)	0.847	0.53	-	0.231	-	2.28	ND (0.022)	4.32	1.58	5.07	2.3	2.67	ND (0.22)	1.66	-	4.07	0.476	0.223
MS Semi-volatile TIC																								
Total TIC, Semi-Volatile	ug/l	-	169.3 J	49.6 J	955 J	950 J	220.2 J	220.6 J	1043 J	52 J	949 J	634 J	0	622 J	116.3 J	341 J	1625 J	2396 J	0	474 J	1428 J	2322 J	933 J	982 J

Table 4a
Hess Corporation Former Port Reading Terminal
750 Cliff Road, Port Reading, New Jersey
South Landfarm Groundwater Sampling Analytical Results July and October 2020

Client Sample ID:		NJ Groundwater Criteria (NJAC 7:9C 6/1/2020)[1]	LS-1R	LS-2	LS-3	LS-4	LS-1R	LS-2	LS-3	LS-4
Lab Sample ID:			JD10277-3	JD10277-4	JD10277-5	JD10277-6	JD14484-3	JD14484-4	JD14484-5	JD14484-6
Date Sampled:			7/16/2020	7/16/2020	7/16/2020	7/16/2020	10/8/2020	10/8/2020	10/8/2020	10/8/2020
Matrix:			Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
MS Volatiles (SW846 8260D)										
Acetone	ug/l	6000	ND (6.0)	ND (6.0)	6.7 J	14.9	ND (6.0)	ND (6.0)	12.6	19.8
Benzene	ug/l	1	ND (0.43)	0.52	**10**	**5.3**	ND (0.43)	ND (0.43)	**3.9**	**3.5**
Bromochloromethane	ug/l	-	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)
Bromodichloromethane	ug/l	1	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)
Bromoform	ug/l	4	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)
Bromomethane	ug/l	10	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)
2-Butanone (MEK)	ug/l	300	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)
Carbon disulfide	ug/l	700	ND (0.95)	ND (0.95)	ND (0.95)	ND (0.95)	ND (0.46) [a]	ND (0.46) [a]	ND (0.46) [a]	ND (0.46) [a]
Carbon tetrachloride	ug/l	1	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)
Chlorobenzene	ug/l	50	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)
Chloroethane	ug/l	-	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)
Chloroform	ug/l	70	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Chloromethane	ug/l	-	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)
Cyclohexane	ug/l	-	ND (0.78)	3.6 J	3.5 J	0.95 J	ND (0.78)	2.8 J	3.8 J	1.3 J
1,2-Dibromo-3-chloropropane	ug/l	0.02	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)
Dibromochloromethane	ug/l	1	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)
1,2-Dibromoethane	ug/l	0.03	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)
1,2-Dichlorobenzene	ug/l	600	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)
1,3-Dichlorobenzene	ug/l	600	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)
1,4-Dichlorobenzene	ug/l	75	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)
Dichlorodifluoromethane	ug/l	1000	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4) [a]	ND (1.4) [a]	ND (1.4) [a]	ND (1.4) [a]
1,1-Dichloroethane	ug/l	50	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)
1,2-Dichloroethane	ug/l	2	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)
1,1-Dichloroethene	ug/l	1	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)
cis-1,2-Dichloroethene	ug/l	70	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)
trans-1,2-Dichloroethene	ug/l	100	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)
1,2-Dichloropropane	ug/l	1	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)
cis-1,3-Dichloropropene	ug/l	1	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)
trans-1,3-Dichloropropene	ug/l	1	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)
Ethylbenzene	ug/l	700	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)
Freon 113	ug/l	20000	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)
2-Hexanone	ug/l	40	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
Isopropylbenzene	ug/l	700	ND (0.65)	1.2	1.8	1.9	ND (0.65)	0.71 J	2.1	1.2
Methyl Acetate	ug/l	7000	ND (0.80)	ND (0.80)	ND (0.80)	ND (0.80)	ND (0.80)	ND (0.80)	ND (0.80)	ND (0.80)
Methylcyclohexane	ug/l	-	ND (0.60)	2.4 J	2.5 J	ND (0.60)	ND (0.60)	1.9 J	3.2 J	ND (0.60)
Methyl Tert Butyl Ether	ug/l	70	1.4	ND (0.51)	ND (0.51)	ND (0.51)	1.6	ND (0.51)	ND (0.51)	ND (0.51)
4-Methyl-2-pentanone(MIBK)	ug/l	-	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)
Methylene chloride	ug/l	3	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Styrene	ug/l	100	ND (0.70)	ND (0.70)	ND (0.70)	ND (0.70)	ND (0.49)	ND (0.49)	ND (0.49)	ND (0.49)
Tert Butyl Alcohol	ug/l	100	ND (5.8)	ND (5.8)	**977**	32.5	ND (5.8)	6.1 J	**1070**	82.9
1,1,2,2-Tetrachloroethane	ug/l	1	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)
Tetrachloroethene	ug/l	1	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)
Toluene	ug/l	600	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)
1,2,3-Trichlorobenzene	ug/l	-	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
1,2,4-Trichlorobenzene	ug/l	9	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
1,1,1-Trichloroethane	ug/l	30	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)
1,1,2-Trichloroethane	ug/l	3	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)
Trichloroethene	ug/l	1	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)
Trichlorofluoromethane	ug/l	2000	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)
Vinyl chloride	ug/l	1	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)
m,p-Xylene	ug/l	-	ND (0.78)	ND (0.78)	1.3	0.95 J	ND (0.78)	ND (0.78)	1.1	1.5
o-Xylene	ug/l	-	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)
Xylene (total)	ug/l	1000	ND (0.59)	ND (0.59)	1.3	0.95 J	ND (0.59)	ND (0.59)	1.1	1.5
MS Volatile TIC										
Total TIC, Volatile	ug/l	-	0	6.8 J	164.9 J	22.1 J	0	0	102.7 J	44.1 J
Metals Analysis										
Arsenic	ug/l	3	**19.4**	**59.7**	**12.6**	**29.2**	**11.9**	**43.6**	**12.7**	**24.2**
Barium	ug/l	6000	<200	716	582	<200	<200	824	597	<200
Cadmium	ug/l	4	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Chromium	ug/l	70	<10	<10	<10	<10	<10	<10	<10	<10
Iron	ug/l	300	NA	NA	NA	NA	**11400**	**2580**	**84000**	**6740**
Lead	ug/l	5	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Manganese	ug/l	50	NA	NA	NA	NA	**2710**	**172**	**1390**	**154**
Mercury	ug/l	2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Selenium	ug/l	40	<10	<10	<10	<10	<10	<10	<10	<10
Silver	ug/l	40	<10	<10	<10	<10	19	<10	<10	<10
Sodium	ug/l	50000	NA	NA	NA	NA	**82500**	**174000**	**1660000**	**376000**
General Chemistry										
Chloride	mg/l	250	77.5	**283**	**3130**	**434**	83.8	**368**	**3340**	**514**
Fluoride	mg/l	2	0.81	<0.20	0.38	0.53	0.86	<0.20	0.37	0.55
Nitrogen, Ammonia	mg/l	3	1.8	1.7	**11.6**	**24.2**	1.4	1.8	**9.5**	**25.1**
Nitrogen, Nitrate	mg/l	10	<0.11 [a]	<0.11 [a]	<0.11 [a]	<0.11 [a]	<0.11 [b]	<0.11 [b]	<0.11 [b]	<0.11 [b]
Nitrogen, Nitrate + Nitrite	mg/l	10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrogen, Nitrite	mg/l	1	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	0.011	<0.010
Phenols	mg/l	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Solids, Total Dissolved	mg/l	500	390	**778**	**6490**	**882**	250	**953**	**4630**	**1080**
Specific Conductivity	umhos	-	644	1390	8950	1800	681	1740	10000	3530
Sulfate	mg/l	250	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Organic Carbon	mg/l	-	11.6	12.9	57.9	26.5	14.2	16	61	35.8
Total Organic Halides	mg/l	-	<0.050	0.11	0.62 [f]	<0.050	0.094	0.058	0.34	0.14

ND - Non-Detect

NA - Not Analyzed

Table 4b
Hess Corporation Former Port Reading Terminal
750 Cliff Road, Port Reading, New Jersey
South Landfarm Groundwater Sampling Analytical Results - 2021

Client Sample ID:		NJ Groundwater Criteria (NJAC 7:9C 6/1/2020)[1]	LS-1R	LS-2	LS-3	LS-4	LS-1R	LS-2	LS-3	LS-4	LS-1R	LS-2	LS-3	LS-4	LS-1R	LS-2	LS-3	LS-4
Lab Sample ID:			JD19809-3	JD19809-4	JD19809-5	JD19809-6	JD23447-1	JD23447-2	JD23447-3	JD23447-4	JD28307-3	JD28307-4	JD28307-5	JD28307-6	JD33587-3	JD33587-4	JD33587-5	JD33587-6
Date Sampled:			1/29/2021	1/29/2021	1/29/2021	1/29/2021	4/15/2021	4/15/2021	4/15/2021	4/15/2021	7/15/2021	7/15/2021	7/15/2021	7/15/2021	10/15/2021	10/15/2021	10/15/2021	10/15/2021
Matrix:			Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
MS Volatiles (SW846 8260D)																		
Acetone	ug/l	6000	ND (6.0)	ND (6.0)	13.7	7.9 J	ND (6.0)	ND (6.0)	7.9 J	13.5	ND (3.1) [a]	ND (3.1) [a]	34.9	9.9 J	ND (3.1) [a]	ND (3.1) [a]	9.9 J [a]	12.7 [a]
Benzene	ug/l	1	ND (0.43)	ND (0.43)	**56**	0.77	ND (0.43)	ND (0.43)	**41.2**	**1.7**	ND (0.43)	ND (0.43)	**7**	**7.9**	ND (0.43)	ND (0.43)	**1.1**	**5.1**
Bromochloromethane	ug/l	-	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)
Bromodichloromethane	ug/l	1	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)
Bromoform	ug/l	4	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63) [b]	ND (0.63) [b]	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)
Bromomethane	ug/l	10	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6) [a]	ND (1.6) [a]	ND (1.6)	ND (1.6) [a]	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)
2-Butanone (MEK)	ug/l	300	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)
Carbon disulfide	ug/l	700	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)
Carbon tetrachloride	ug/l	1	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)
Chlorobenzene	ug/l	50	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)
Chloroethane	ug/l	-	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)
Chloroform	ug/l	70	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Chloromethane	ug/l	-	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)
Cyclohexane	ug/l	-	ND (0.78)	2.1 J	7	0.78 J	ND (0.78) [a]	ND (0.78) [a]	6.7	ND (0.78) [a]	ND (0.78)	2.1 J	ND (0.78)	1.0 J	ND (0.78)	1.3 J	2.3 J	1.2 J
1,2-Dibromo-3-chloropropane	ug/l	0.02	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)
Dibromochloromethane	ug/l	1	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)
1,2-Dibromoethane	ug/l	0.03	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)
1,2-Dichlorobenzene	ug/l	600	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)
1,3-Dichlorobenzene	ug/l	600	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)
1,4-Dichlorobenzene	ug/l	75	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)
Dichlorodifluoromethane	ug/l	1000	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)
1,1-Dichloroethane	ug/l	50	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)
1,2-Dichloroethane	ug/l	2	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)
1,1-Dichloroethene	ug/l	1	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)
cis-1,2-Dichloroethene	ug/l	70	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)
trans-1,2-Dichloroethene	ug/l	100	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)
1,2-Dichloropropane	ug/l	1	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)
cis-1,3-Dichloropropene	ug/l	1	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)
trans-1,3-Dichloropropene	ug/l	1	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)
Ethylbenzene	ug/l	700	ND (0.60)	ND (0.60)	0.90 J	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)
Freon 113	ug/l	20000	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)
2-Hexanone	ug/l	40	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
Isopropylbenzene	ug/l	700	ND (0.65)	1.2	1.8	1.3	ND (0.65)	2.1	1.8	0.85 J	ND (0.65)	1	1	1.5	ND (0.65)	ND (0.65)	1.8	1.3
Methyl Acetate	ug/l	7000	ND (0.80)	ND (0.80)	ND (0.80)	ND (0.80)	ND (0.80)	ND (0.80)	ND (0.80)	ND (0.80)	ND (0.80)	ND (0.80)	ND (0.80)	ND (0.80)	ND (0.80) [b]	ND (0.80) [b]	ND (0.80) [b]	ND (0.80) [b]
Methylcyclohexane	ug/l	-	ND (0.60)	1.6 J	6.6	ND (0.60)	ND (0.60)	ND (0.60)	5.5	ND (0.60)	ND (0.60)	0.90 J	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	1.1 J	ND (0.60)
Methyl Tert Butyl Ether	ug/l	70	1.8	ND (0.51)	ND (0.51)	ND (0.51)	1.5	ND (0.51)	ND (0.51)	ND (0.51)	0.51 J	ND (0.51)	ND (0.51)	ND (0.51)	0.87 J	ND (0.51)	ND (0.51)	ND (0.51)
4-Methyl-2-pentanone(MIBK)	ug/l	-	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9) [b]	ND (1.9) [b]	ND (1.9) [b]	ND (1.9) [b]
Methylene chloride	ug/l	3	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Styrene	ug/l	100	ND (0.49)	ND (0.49)	ND (0.49)	ND (0.49)	ND (0.49)	ND (0.49)	ND (0.49)	ND (0.49)	ND (0.49)	ND (0.49)	ND (0.49)	ND (0.49)	ND (0.49)	ND (0.49)	ND (0.49)	ND (0.49)
Tert Butyl Alcohol	ug/l	100	ND (5.8)	ND (5.8)	**543**	21.5	ND (5.8)	ND (5.8)	**504**	21.8	ND (5.8)	ND (5.8)	**1330**	61.9	ND (5.8)	ND (5.8)	**1420**	94.2
1,1,2,2-Tetrachloroethane	ug/l	1	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)
Tetrachloroethene	ug/l	1	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)
Toluene	ug/l	600	ND (0.53)	ND (0.53)	2.2	ND (0.53)	ND (0.53)	ND (0.53)	0.90 J	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)
1,2,3-Trichlorobenzene	ug/l	-	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
1,2,4-Trichlorobenzene	ug/l	9	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
1,1,1-Trichloroethane	ug/l	30	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)
1,1,2-Trichloroethane	ug/l	3	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)
Trichloroethene	ug/l	1	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)
Trichlorofluoromethane	ug/l	2000	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)
Vinyl chloride	ug/l	1	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)
m,p-Xylene	ug/l	-	ND (0.78)	ND (0.78)	2.3	1.1	ND (0.78)	ND (0.78)	2.2	1.2	ND (0.78)	ND (0.78)	ND (0.78)	1.3	ND (0.78)	ND (0.78)	ND (0.78)	2.2
o-Xylene	ug/l	-	ND (0.59)	ND (0.59)	0.75 J	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)
Xylene (total)	ug/l	1000	ND (0.59)	ND (0.59)	3.1	1.1	ND (0.59)	ND (0.59)	2.2	1.2	ND (0.59)	ND (0.59)	ND (0.59)	1.3	ND (0.59)	ND (0.59)	ND (0.59)	2.2
MS Volatile TIC																		
Total TIC, Volatile	ug/l	-	0	8 J	193.8 J	91.5 J	0	0	327.6 J	61.5 J	0	5 J	174.8 J	85.7 J	0	0	188.3 J	104.2 J
Metals Analysis																		
Arsenic	ug/l	3	**9.5**	**29**	**7.1**	**14.3**	**7.5**	**37.6**	**7.4**	**14.8**	**10.5**	**43.9**	**11.7**	**24**	**8.1**	**26.4**	**4.3**	**22**
Barium	ug/l	6000	<200	307	289	<200	<200	298	298	<200	<200	634	601	<200	<200	632	456	<200
Cadmium	ug/l	4	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.1	<3.0
Chromium	ug/l	70	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Iron	ug/l	300	**10500**	**3560**	**26800**	**5230**	**8430**	**4590**	**46700**	**5600**	**7640**	**3630**	**119000**	**12300**	**9180**	**1890**	**45200**	**9950**
Lead	ug/l	5	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Manganese	ug/l	50	**2300**	**171**	**1040**	**178**	**3270**	**214**	**940**	**205**	**581**	**301**	**1960**	**246**	**1290**	**180**	**1320**	**261**
Mercury	ug/l	2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Selenium	ug/l	40	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	11.8	<10	<10	<10	<10	<10
Silver	ug/l	40	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	12.4	<10
Sodium	ug/l	50000	**73200**	30500	**999000**	**416000**	**82200**	23900	**909000**	**380000**	**58900**	**102000**	**1440000**	**368000**	**70800**	**107000**	**1320000**	**423000**
General Chemistry																		
Chloride	mg/l	250	79.9	39.3	<200	**731**	72.9	26.3	**1800**	**655**	34.1	198	**3080**	**555**	52.4	211	**3270**	**764**
Fluoride	mg/l	2	0.66	0.27	<2	1.2	0.65	<0.2	0.36	0.49	0.75	<0.20	0.33	0.53	0.84	<0.20	0.35	0.62
Nitrogen, Ammonia	mg/l	3	NA	NA	NA	NA	1.7	0.41	**6.4**	**27.8**	0.94	1.4	**10.5**	**33.6**	0.92	1.5	**10**	**34.8**
Nitrogen, Nitrate	mg/l	10	<0.11 [b]	<0.11 [b]	<0.11 [b]	<0.11 [b]	<0.11 [b]	<0.11 [b]	<0.11 [b]	<0.11 [b]	<0.11 [a]	<0.11 [a]	<0.11 [a]	<0.11 [a]	<0.11 [c]	<0.11 [c]	<0.11 [c]	<0.11 [c]
Nitrogen, Nitrate + Nitrite	mg/l	10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrogen, Nitrite	mg/l	1	0.014	<.001	<.001	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phenols	mg/l	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.20	<0.20	<0.20	1.4	<0.20	0.71	<0.20	<0.20
Solids, Total Dissolved	mg/l	500	155	20	**2580**	**870**	260	140	**3240**	**1180**	127	**555**	**5810**	**1080**	240	497	**4740**	**1100**
Specific Conductivity	umh	-	0.673	0.446	5.94	2.79	0.66	0.403	6.19	2.53	428	1070	9950	2390	494	1160	9180	2780
Sulfate	mg/l	250	<2	2.5	**2620**	<8	<2	<2	4.8	3.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.1	<2.0
Total Organic Carbon	mg/l	-	11.4	11.1	38.6	34.9	14.3	11.3	42.3	32.7	11.1	13.5	62.5	48.8	11.4	12.5	71.6	45
Total Organic Halides	mg/l	-	<0.2	<0.2	<0.2	<0.2	<0.050	<0.050	0.19	0.084	<0.050	<0.050	0.18	0.06	<0.10	<0.10	0.2	<0.10

ND - Non-Detect

NA - Not Analyzed

Table 4c
Hess Corporation Port Reading Terminal
750 Cliff Road, Port Reading, New Jersey
South Landfarm Groundwater Sampling Analytical Results - January and April 2022

Client Sample ID:		NJ Groundwater Criteria (NJAC 7:9C 6/1/2020)[1]	LS-1R	LS-2	LS-3	LS-4	LS-1R	LS-2	LS-3	LS-4
Lab Sample ID:			JD38862-3	JD38862-4	JD38862-5	JD38862-6	JD43514-3	JD43514-4	JD43514-5	JD43514-6
Date Sampled:			1/28/2022	1/28/2022	1/28/2022	1/28/2022	4/21/2022	4/21/2022	4/21/2022	4/21/2022
Matrix:			Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
MS Volatiles (SW846 8260D)										
Acetone	ug/l	6000	ND (3.1)	ND (3.1)	10.5	17.7	ND (3.1)	ND (3.1)	11.6	14.2
Benzene	ug/l	1	ND (0.43)	ND (0.43)	**78.6**	**2.4**	ND (0.43)	ND (0.43)	**55.5**	**8.1**
Bromochloromethane	ug/l	-	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)
Bromodichloromethane	ug/l	1	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)
Bromoform	ug/l	4	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)
Bromomethane	ug/l	10	ND (1.6)	ND (1.6) [a]	ND (1.6) [a]	ND (1.6) [a]	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)
2-Butanone (MEK)	ug/l	300	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9) [a]	ND (6.9) [a]	ND (6.9) [a]	ND (6.9) [a]
Carbon disulfide	ug/l	700	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46) [b]	ND (0.46) [b]	ND (0.46) [b]	ND (0.46) [b]
Carbon tetrachloride	ug/l	1	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)
Chlorobenzene	ug/l	50	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)
Chloroethane	ug/l	-	ND (0.73) [a]	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)
Chloroform	ug/l	70	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Chloromethane	ug/l	-	ND (0.76) [a]	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)
Cyclohexane	ug/l	-	ND (0.78) [a]	3.1 J	11.6	0.80 J	ND (0.78)	ND (0.78)	7.8	ND (0.78)
1,2-Dibromo-3-chloropropane	ug/l	0.02	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53) [a]	ND (0.53) [a]	ND (0.53) [a]	ND (0.53) [a]
Dibromochloromethane	ug/l	1	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)
1,2-Dibromoethane	ug/l	0.03	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)
1,2-Dichlorobenzene	ug/l	600	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)
1,3-Dichlorobenzene	ug/l	600	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)
1,4-Dichlorobenzene	ug/l	75	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)
Dichlorodifluoromethane	ug/l	1000	ND (0.56) [a]	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)
1,1-Dichloroethane	ug/l	50	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)
1,2-Dichloroethane	ug/l	2	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)
1,1-Dichloroethene	ug/l	1	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)
cis-1,2-Dichloroethene	ug/l	70	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)
trans-1,2-Dichloroethene	ug/l	100	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)
1,2-Dichloropropane	ug/l	1	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)
cis-1,3-Dichloropropene	ug/l	1	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)
trans-1,3-Dichloropropene	ug/l	1	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)
Ethylbenzene	ug/l	700	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)
Freon 113	ug/l	20000	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58) [c]	ND (0.58) [c]	ND (0.58) [c]	ND (0.58) [c]
2-Hexanone	ug/l	40	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0) [a]	ND (2.0) [a]	ND (2.0) [a]	ND (2.0) [a]
Isopropylbenzene	ug/l	700	ND (0.65)	1.8	3.2	ND (0.65)	ND (0.65)	1.1	2.7	0.87 J
Methyl Acetate	ug/l	7000	ND (0.80)	ND (0.80)	ND (0.80)	ND (0.80)	ND (0.80) [a]	ND (0.80) [a]	ND (0.80) [a]	ND (0.80) [a]
Methylcyclohexane	ug/l	-	ND (0.60)	1.5 J	12.7	ND (0.60)	ND (0.60)	ND (0.60)	8	ND (0.60)
Methyl Tert Butyl Ether	ug/l	70	1.6	ND (0.51)	ND (0.51)	ND (0.51)	1.4	ND (0.51)	ND (0.51)	ND (0.51)
4-Methyl-2-pentanone(MIBK)	ug/l	-	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9) [a]	ND (1.9) [a]	ND (1.9) [a]	ND (1.9) [a]
Methylene chloride	ug/l	3	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Styrene	ug/l	100	ND (0.49)	ND (0.49)	ND (0.49)	ND (0.49)	ND (0.49)	ND (0.49)	ND (0.49)	ND (0.49)
Tert Butyl Alcohol	ug/l	100	ND (5.8)	ND (5.8)	**420**	18.9	ND (5.8)	ND (5.8)	**489**	43.7
1,1,2,2-Tetrachloroethane	ug/l	1	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65) [a]	ND (0.65) [a]	ND (0.65) [a]	ND (0.65) [a]
Tetrachloroethene	ug/l	1	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)
Toluene	ug/l	600	ND (0.53)	ND (0.53)	2.5	ND (0.53)	ND (0.53)	ND (0.53)	1.6	ND (0.53)
1,2,3-Trichlorobenzene	ug/l	-	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
1,2,4-Trichlorobenzene	ug/l	9	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
1,1,1-Trichloroethane	ug/l	30	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)
1,1,2-Trichloroethane	ug/l	3	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)
Trichloroethene	ug/l	1	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)
Trichlorofluoromethane	ug/l	2000	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)
Vinyl chloride	ug/l	1	ND (0.79) [a]	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)
m,p-Xylene	ug/l	-	ND (0.78)	ND (0.78)	3.2	1.7	ND (0.78)	ND (0.78)	2.8	2.1
o-Xylene	ug/l	-	ND (0.59)	ND (0.59)	0.88 J	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)
Xylene (total)	ug/l	1000	ND (0.59)	ND (0.59)	4.1	1.7	ND (0.59)	ND (0.59)	2.8	2.1
MS Volatile TIC										
Total TIC, Volatile	ug/l	-	0	12.5 J	202.9 J	78 J	0	0	213.6 J	79.6 J
Metals Analysis										
Arsenic	ug/l	3	**8.6**	**28.7**	**9.5**	**20.8**	**13.8**	**51.5**	**10.2**	**28.9**
Barium	ug/l	6000	<200	345	<200	<200	<200	435	226	<200
Cadmium	ug/l	4	<3.0	<3.0	<3.0	<3.0	<3.0	3.1	<3.0	<3.0
Chromium	ug/l	70	<10	<10	<10	<10	<10	<10	<10	<10
Iron	ug/l	300	**9320**	**3310**	**31900**	**10700**	**18300**	**7640**	**42300**	**16900**
Lead	ug/l	5	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Manganese	ug/l	50	**2360**	**161**	**619**	**248**	**3810**	**244**	**634**	**301**
Mercury	ug/l	2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Selenium	ug/l	40	<10	<10	<10	<10	<10	<10	<10	<10
Silver	ug/l	40	<10	<10	<10	<10	<10	<10	<10	<10
Sodium	ug/l	50000	**68000**	31300	**639000**	**562000**	**77000**	37900	**772000**	**566000**
General Chemistry										
Chloride	mg/l	250	71.5	44.1	**1100**	**965**	87.7	67.8	**1430**	**813**
Fluoride	mg/l	2	0.72	<0.20	0.35	0.55	0.87	<0.20	0.54	0.68
Nitrogen, Ammonia	mg/l	3	1.5	0.68	**4.5**	**41.1**	2.1	1.1	**7.3**	**45.6**
Nitrogen, Nitrate	mg/l	10	<0.11 [b]	<0.11 [b]	<0.11 [b]	<0.11 [b]	0.13 [d]	<0.11 [d]	0.41 [d]	<0.11 [d]
Nitrogen, Nitrate + Nitrite	mg/l	10	<0.10	<0.10	<0.10	<0.10	0.13	<0.10	0.41	<0.10
Nitrogen, Nitrite	mg/l	1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phenols	mg/l	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Solids, Total Dissolved	mg/l	500	16	240	**1280**	**1390**	348	323	**2540**	**1650**
Specific Conductivity	umhos/cm	-	496	491	38100	3450	651	537	4940	3190
Sulfate	mg/l	250	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Organic Carbon	mg/l	-	10.1	10.8	31.3	43	11.2	11.8	42.5	47.2
Total Organic Halides	mg/l	-	<0.10	<0.10	<0.10	0.11	<0.10	<0.10	0.12	<0.10

ND - Non-Detect

NA - Not Analyzed

Table 5
Hess Corporation Former Port Reading Complex
750 Cliff Road, Port Reading, New Jersey
AOC 5- Aeration Basins
2021 Groundwater Analytical Results

Client Sample ID:	NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	AB-1			AB-3			AB-4R			AB-4D			AB-5			AB-6		
Lab Sample ID:		L2166200-12			L2166200-09			L2166200-07			L2166200-06			L2166200-08			L2168151-04		
Date Sampled:		12/2/2021			12/2/2021			12/2/2021			12/2/2021			12/2/2021			12/10/2021		
Matrix:		WATER			WATER			WATER			WATER			WATER			WATER		
ANALYTE	**(ug/l)**	**Conc**	**Q**	**MDL**	**Conc**	**Q**	**MDL**	**Conc**	**Q**	**MDL**	**Conc**	**Q**	**MDL**	**Conc**	**Q**	**MDL**	**Conc**	**Q**	**MDL**
VOLATILE ORGANICS BY GC/MS																			
1,2-Dibromo-3-chloropropane	0.02	ND		0.35	ND		0.35	ND		0.35	ND		0.35	ND		0.35	ND		0.35
1,2-Dibromoethane	0.03	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19
Methylene chloride	3	ND		0.68	ND		0.68	ND		0.68	ND		0.68	ND		0.68	ND		0.68
1,1-Dichloroethane	50	ND		0.21	ND		0.21	ND		0.21	1.2		0.21	ND		0.21	ND		0.21
Chloroform	70	ND		0.22	ND		0.22	ND		0.22	ND		0.22	ND		0.22	ND		0.22
Carbon tetrachloride	1	ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13
1,2-Dichloropropane	1	ND		0.14	ND		0.14	ND		0.14	0.42	J	0.14	ND		0.14	ND		0.14
Dibromochloromethane	1	ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15
1,1,2-Trichloroethane	3	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14
Tetrachloroethene	1	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18
Chlorobenzene	50	ND		0.18	9		0.18	ND		0.18	ND		0.18	ND		0.18	25		0.18
Trichlorofluoromethane	2000	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
1,2-Dichloroethane	2	ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13
1,1,1-Trichloroethane	30	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
Bromodichloromethane	1	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19
trans-1,3-Dichloropropene		ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
cis-1,3-Dichloropropene		ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14
1,3-Dichloropropene, Total	1	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14
Bromoform	4	ND		0.25	ND		0.25	ND		0.25	ND		0.25	ND		0.25	ND		0.25
1,1,2,2-Tetrachloroethane	1	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17
Benzene	1	ND		0.08	**3.4**		**0.08**	ND		0.08	ND		0.08	ND		0.08	**2.2**		**0.08**
Toluene	600	ND		0.2	ND		0.2	ND		0.2	ND		0.2	ND		0.2	0.93		0.2
Ethylbenzene	700	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17	1.1		0.17
Chloromethane		ND		0.2	ND		0.2	ND		0.2	ND		0.2	ND		0.2	ND		0.2
Bromomethane	10	0.29	J	0.26	ND		0.26	ND		0.26	ND		0.26	0.31	J	0.26	ND		0.26
Vinyl chloride	1	ND		0.07	ND		0.07	ND		0.07	ND		0.07	ND		0.07	ND		0.07
Chloroethane		ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13
1,1-Dichloroethene	1	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17
trans-1,2-Dichloroethene	100	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
Trichloroethene	1	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18
1,2-Dichlorobenzene	600	ND		0.18	0.34	J	0.18	ND		0.18	ND		0.18	ND		0.18	0.36	J	0.18
1,3-Dichlorobenzene	600	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19	0.62	J	0.19
1,4-Dichlorobenzene	75	ND		0.19	0.64	J	0.19	ND		0.19	ND		0.19	ND		0.19	2.5		0.19
Methyl tert butyl ether	70	ND		0.17	10		0.17	4.4		0.17	4.3		0.17	ND		0.17	ND		0.17
p/m-Xylene		ND		0.33	ND		0.33	ND		0.33	ND		0.33	ND		0.33	1.6		0.33
o-Xylene		ND		0.39	ND		0.39	ND		0.39	ND		0.39	ND		0.39	0.72	J	0.39
Xylenes, Total	1000	ND		0.33	ND		0.33	ND		0.33	ND		0.33	ND		0.33	2.3	J	0.33
cis-1,2-Dichloroethene	70	ND		0.19	ND		0.19	ND		0.19	1.7		0.19	ND		0.19	ND		0.19
1,2-Dichloroethene, Total		ND		0.16	ND		0.16	ND		0.16	1.7		0.16	ND		0.16	ND		0.16
Styrene	100	ND		0.36	ND		0.36	ND		0.36	ND		0.36	ND		0.36	ND		0.36
Dichlorodifluoromethane	1000	ND		0.24	ND		0.24	ND		0.24	ND		0.24	ND		0.24	ND		0.24
Acetone	6000	1.8	J	1.5	ND		1.5	3.5	J	1.5	ND		1.5	7.5		1.5	19		1.5
Carbon disulfide	700	ND		0.3	ND		0.3	ND		0.3	0.59	J	0.3	ND		0.3	0.72	J	0.3
2-Butanone	300	ND		1.9	ND		1.9	ND		1.9	ND		1.9	ND		1.9	ND		1.9
4-Methyl-2-pentanone		ND		0.42	ND		0.42	ND		0.42	ND		0.42	ND		0.42	ND		0.42
2-Hexanone	40	ND		0.52	ND		0.52	ND		0.52	ND		0.52	ND		0.52	ND		0.52
Bromochloromethane		ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15
Isopropylbenzene	700	ND		0.19	0.44	J	0.19	ND		0.19	ND		0.19	ND		0.19	120		0.19
1,2,3-Trichlorobenzene		ND		0.23	ND		0.23	ND		0.23	ND		0.23	ND		0.23	ND		0.23
1,2,4-Trichlorobenzene	9	ND		0.22	ND		0.22	ND		0.22	ND		0.22	ND		0.22	ND		0.22
Methyl Acetate	7000	ND		0.23	ND		0.23	ND		0.23	ND		0.23	ND		0.23	ND		0.23
Cyclohexane		ND		0.27	0.38	J	0.27	ND		0.27	ND		0.27	ND		0.27	2	J	0.27
Tert-Butyl Alcohol	100	6	J	1.4	20		1.4	46		1.4	56		1.4	ND		1.4	3.7	J	1.4
Methyl cyclohexane		ND		0.4	ND		0.4	ND		0.4	ND		0.4	ND		0.4	1.6	J	0.4
Freon-113	20000	ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15
VOLATILE ORGANICS BY GC/MS-TIC																			
Total TIC Compounds		-	-	-	37.5	J	0	5.85	J	0	3.01	J	0	-		-	702	J	0
SEMIVOLATILE ORGANICS BY GC/MS																			
Acenaphthene	400	ND		0.44	15		0.44	0.94	J	0.44	ND		0.44	ND		0.44	ND		0.44
3-Methylphenol/4-Methylphenol	50	ND		0.48	ND		0.48	ND		0.48	ND		0.48	ND		0.48	ND		0.48
Bis(2-chloroethyl)ether	7	ND		0.5	ND		0.5	ND		0.5	ND		0.5	ND		0.5	ND		0.5
2-Chloronaphthalene	600	ND		0.44	ND		0.44	ND		0.44	ND		0.44	ND		0.44	ND		0.44
2,4-Dinitrotoluene	10	ND		1.2	ND		1.2	ND		1.2	ND		1.2	ND		1.2	ND		1.2
2,6-Dinitrotoluene	10	ND		0.93	ND		0.93	ND		0.93	ND		0.93	ND		0.93	ND		0.93
Fluoranthene	300	ND		0.26	1.1	J	0.26	ND		0.26	ND		0.26	ND		0.26	ND		0.26
4-Chlorophenyl phenyl ether		ND		0.49	ND		0.49	ND		0.49	ND		0.49	ND		0.49	ND		0.49
Bis(2-chloroisopropyl)ether	300	ND		0.53	ND		0.53	ND		0.53	ND		0.53	ND		0.53	ND		0.53
Bis(2-chloroethoxy)methane		ND		0.5	ND		0.5	ND		0.5	ND		0.5	ND		0.5	ND		0.5
Hexachlorocyclopentadiene	40	ND		0.69	ND		0.69	ND		0.69	ND		0.69	ND		0.69	ND		0.69
Hexachloroethane	7	ND		0.58	ND		0.58	ND		0.58	ND		0.58	ND		0.58	ND		0.58
Isophorone	40	ND		1.2	ND		1.2	ND		1.2	ND		1.2	ND		1.2	ND		1.2
Naphthalene	300	ND		0.46	ND		0.46	ND		0.46	ND		0.46	ND		0.46	ND		0.46
Nitrobenzene	6	ND		0.77	ND		0.77	ND		0.77	ND		0.77	ND		0.77	ND		0.77
NDPA/DPA	10	ND		0.42	ND		0.42	ND		0.42	ND		0.42	ND		0.42	ND		0.42
n-Nitrosodi-n-propylamine		ND		0.64	ND		0.64	ND		0.64	ND		0.64	ND		0.64	ND		0.64
Bis(2-ethylhexyl)phthalate	3	ND		1.5	ND		1.5	ND		1.5	ND		1.5	ND		1.5	2.2	J	1.5
Butyl benzyl phthalate	100	ND		1.2	ND		1.2	ND		1.2	ND		1.2	ND		1.2	ND		1.2
Di-n-butylphthalate	700	ND		0.39	ND		0.39	ND		0.39	ND		0.39	ND		0.39	ND		0.39
Di-n-octylphthalate	100	ND		1.3	ND		1.3	ND		1.3	ND		1.3	ND		1.3	ND		1.3
Diethyl phthalate	6000	ND		0.38	ND		0.38	ND		0.38	ND		0.38	ND		0.38	ND		0.38
Dimethyl phthalate		ND		1.8	ND		1.8	ND		1.8	ND		1.8	ND		1.8	ND		1.8
Chrysene	5	ND		0.34	ND		0.34	ND		0.34	ND		0.34	ND		0.34	ND		0.34
Acenaphthylene		ND		0.46	ND		0.46	ND		0.46	ND		0.46	ND		0.46	ND		0.46
Anthracene	2000	ND		0.33	ND		0.33	ND		0.33	ND		0.33	ND		0.33	ND		0.33
Benzo(ghi)perylene		ND		0.3	ND		0.3	ND		0.3	ND		0.3	ND		0.3	ND		0.3
Fluorene	300	ND		0.41	ND		0.41	ND		0.41	ND		0.41	ND		0.41	ND		0.41
Phenanthrene		ND		0.33	ND		0.33	ND		0.33	ND		0.33	ND		0.33	ND		0.33
Pyrene	200	ND		0.28	0.51	J	0.28	ND		0.28	ND		0.28	ND		0.28	ND		0.28
4-Chloroaniline	30	ND		1.1	ND		1.1	ND		1.1	ND		1.1	ND		1.1	ND		1.1
2-Nitroaniline		ND		0.5	ND		0.5	ND		0.5	ND		0.5	ND		0.5	ND		0.5
3-Nitroaniline		ND		0.81	ND		0.81	ND		0.81	ND		0.81	ND		0.81	ND		0.81
4-Nitroaniline		ND		0.8	ND		0.8	ND		0.8	ND		0.8	ND		0.8	ND		0.8
Dibenzofuran		ND		0.5	0.65	J	0.5	ND		0.5	ND		0.5	ND		0.5	ND		0.5
2-Methylnaphthalene	30	ND		0.45	ND		0.45	ND		0.45	ND		0.45	ND		0.45	ND		0.45
2,4,6-Trichlorophenol	20	ND		0.61	ND		0.61	ND		0.61	ND		0.61	ND		0.61	ND		0.61
p-Chloro-m-cresol		ND		0.35	ND		0.35	ND		0.35	ND		0.35	ND		0.35	ND		0.35
2-Chlorophenol	40	ND		0.48	ND		0.48	ND		0.48	ND		0.48	ND		0.48	ND		0.48
2,4-Dichlorophenol	20	ND		0.41	ND		0.41	ND		0.41	ND		0.41	ND		0.41	ND		0.41
2,4-Dimethylphenol	100	ND		1.8	ND		1.8	ND		1.8	ND		1.8	ND		1.8	ND		1.8
2-Nitrophenol		ND		0.85	ND		0.85	ND		0.85	ND		0.85	ND		0.85	ND		0.85
4-Nitrophenol		ND		0.67	ND		0.67	ND		0.67	ND		0.67	ND		0.67	ND		0.67
2,4-Dinitrophenol	40	ND		6.6	ND		6.6	ND		6.6	ND		6.6	ND		6.6	ND		6.6
Phenol	2000	ND		0.57	ND		0.57	ND		0.57	ND		0.57	ND		0.57	ND		0.57
2-Methylphenol	50	ND		0.49	ND		0.49	ND		0.49	ND		0.49	ND		0.49	ND		0.49
2,4,5-Trichlorophenol	700	ND		0.77	ND		0.77	ND		0.77	ND		0.77	ND		0.77	ND		0.77
Carbazole		ND		0.49	2.3		0.49	ND		0.49	ND		0.49	ND		0.49	ND		0.49
4-Bromophenyl phenyl ether		ND		0.38	ND		0.38	ND		0.38	ND		0.38	ND		0.38	ND		0.38
3,3'-Dichlorobenzidine	30	ND		1.6	ND		1.6	ND		1.6	ND		1.6	ND		1.6	ND		1.6
Benzaldehyde		ND		0.53	ND		0.53	ND		0.53	ND		0.53	ND		0.53	ND		0.53
Acetophenone	700	ND		0.53	ND		0.53	ND		0.53	ND		0.53	ND		0.53	ND		0.53
Caprolactam	4000	ND		3.3	ND		3.3	ND		3.3	ND		3.3	ND		3.3	ND		3.3
Biphenyl	400	ND		0.46	ND		0.46	ND		0.46	ND		0.46	ND		0.46	ND		0.46
1,2,4,5-Tetrachlorobenzene		ND		0.44	ND		0.44	ND		0.44	ND		0.44	ND		0.44	ND		0.44
Atrazine	3	ND		0.76	ND		0.76	ND		0.76	ND		0.76	ND		0.76	ND		0.76
2,3,4,6-Tetrachlorophenol	200	ND		0.84	ND		0.84	ND		0.84	ND		0.84	ND		0.84	ND		0.84
SEMIVOLATILE ORGANICS BY GC/MS-SIM																			
4,6-Dinitro-o-cresol		ND		0.09	ND		0.09	ND		0.09	ND		0.09	ND		0.09	ND		0.09
Benzo(a)anthracene	0.1	ND		0.02	0.05	J	0.02	0.03	J	0.02	0.02	J	0.02	0.02	J	0.02	0.03	J	0.02
Benzo(a)pyrene	0.1	ND		0.02	ND		0.02	ND		0.02	ND		0.02	ND		0.02	ND		0.02
Benzo(b)fluoranthene	0.2	ND		0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.01
Benzo(k)fluoranthene	0.5	ND		0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.01
Dibenzo(a,h)anthracene	0.3	ND		0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.01

Table 5
Hess Corporation Former Port Reading Complex
750 Cliff Road, Port Reading, New Jersey
AOC 5- Aeration Basins
Groundwater Analytical Results

Client Sample ID:	NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	AB-1			AB-3			AB-4R			AB-4D			AB-5			AB-6		
Lab Sample ID:		L2166200-12			L2166200-09			L2166200-07			L2166200-06			L2166200-08			L2168151-04		
Date Sampled:		12/2/2021			12/2/2021			12/2/2021			12/2/2021			12/2/2021			12/10/2021		
Matrix:		WATER			WATER			WATER			WATER			WATER			WATER		
Indeno(1,2,3-cd)pyrene	0.2	ND		0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.01
Hexachlorobenzene	0.02	ND		0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.01
Pentachlorophenol	0.3	ND		0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.01
Hexachlorobutadiene	1	ND		0.05	ND		0.05	ND		0.05	ND		0.05	ND		0.05	ND		0.05
1,4-Dioxane	0.4	ND		0.0314	0.231		0.0314	0.24		0.0303	**14.1**		**0.0471**	**2.63**		**0.0339**	ND		0.0314
SEMIVOLATILE ORGANICS BY GC/MS-TIC																			
Total TIC Compounds		8.5	J	0	41.6	J	0	289	J	0	699	J	0	8.55	J	0	126	J	0
TOTAL METALS																			
Aluminum, Total	200	**391**		**3.27**	**228**		**3.27**	55		3.27	12		3.27	48.3		3.27	**382**		**3.27**
Antimony, Total	6	ND		0.429	ND		0.429	4.358		0.429	ND		0.429	ND		0.429	0.5492	J	0.429
Arsenic, Total	3	**6.837**		**0.165**	1.069		0.165	1.353		0.165	0.9168		0.165	1.397		0.165	1.313		0.165
Barium, Total	6000	38.78		0.173	123.8		0.173	100.7		0.173	74.47		0.173	30.92		0.173	70		0.173
Beryllium, Total	1	ND		0.107	ND		0.107	ND		0.107	ND		0.107	ND		0.107	ND		0.107
Cadmium, Total	4	ND		0.0599	ND		0.0599	ND		0.0599	ND		0.0599	0.0837	J	0.0599	ND		0.0599
Calcium, Total		46000		39.4	22000		39.4	84000		39.4	79100		39.4	29100		39.4	35800		39.4
Chromium, Total	70	1.075		0.178	1.603		0.178	0.6568	J	0.178	1.793		0.178	1.291		0.178	1.921		0.178
Cobalt, Total	100	1.3		0.163	0.2372	J	0.163	0.2549	J	0.163	0.2084	J	0.163	0.3847	J	0.163	0.5117		0.163
Copper, Total	1300	2.971		0.384	16.5		0.384	ND		0.384	4.845		0.384	3.588		0.384	11.57		0.384
Iron, Total	300	**2810**		**19.1**	**664**		**19.1**	**6780**		**19.1**	27.1	J	19.1	**3390**		**19.1**	**1720**		**19.1**
Lead, Total	5	1.213		0.343	0.519	J	0.343	ND		0.343	ND		0.343	0.7673	J	0.343	**5.134**		**0.343**
Magnesium, Total		4670		24.2	25100		24.2	78000		24.2	286000		24.2	2980		24.2	12400		24.2
Manganese, Total	50	**68.44**		**0.44**	19.1		0.44	**106.5**		**0.44**	3.043		0.44	**69.56**		**0.44**	35.24		0.44
Mercury, Total	2	ND		0.0915	0.12	J	0.0915	ND		0.0915	ND		0.0915	ND		0.0915	ND		0.0915
Nickel, Total	100	0.8244	J	0.556	2.093		0.556	0.7832	J	0.556	0.8255	J	0.556	0.676	J	0.556	2.973		0.556
Potassium, Total		25800		30.9	154000		30.9	165000		30.9	152000		30.9	2850		30.9	9740		30.9
Selenium, Total	40	ND		1.73	ND		1.73	ND		1.73	ND		1.73	ND		1.73	ND		1.73
Silver, Total	40	ND		0.163	ND		0.163	ND		0.163	ND		0.163	ND		0.163	ND		0.163
Sodium, Total	50000	37400		29.3	**832000**		**293**	**1220000**		**1460**	**4850000**		**1460**	5200		29.3	**123000**		**29.3**
Thallium, Total	2	ND		0.143	ND		0.143	ND		0.143	ND		0.143	ND		0.143	0.1854	J	0.143
Vanadium, Total		8.242		1.57	5.021		1.57	10.89		1.57	6.361		1.57	5.187		1.57	2.485	J	1.57
Zinc, Total	2000	14.96		3.41	70.19		3.41	ND		3.41	15.46		3.41	ND		3.41	33.76		3.41
GENERAL CHEMISTRY																			
Nitrogen, Ammonia	3000	148		24	**4550**		**48**	**13300**		**24**	**12000**		**24**	396		24	68.6	J	24

Table 6
Hess Corporation Former Port Reading Complex
750 Cliff Road, Port Reading NJ
2021 Off-site Groundwater Analytical Results

Client Sample ID:	NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	SC-1			SC-1D			SC-1DD			SC-2			SC-2D		
Lab Sample ID:		L2166830-01			L2166830-04			L2166830-02			L2166830-07			L2166830-03		
Date Sampled:		12/6/2021			12/6/2021			12/6/2021			12/6/2021			12/6/2021		
Matrix:		WATER			WATER			WATER			WATER			WATER		
ANALYTE	(ug/l)	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
VOLATILE ORGANICS BY GC/MS																
1,2-Dibromo-3-chloropropane	0.02	ND		0.35	ND		0.35	ND		0.35	ND		0.35	ND		0.35
1,2-Dibromoethane	0.03	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19
Methylene chloride	3	ND		0.68	ND		0.68	ND		0.68	ND		0.68	ND		0.68
1,1-Dichloroethane	50	ND		0.21	ND		0.21	ND		0.21	ND		0.21	ND		0.21
Chloroform	70	ND		0.22	ND		0.22	ND		0.22	ND		0.22	ND		0.22
Carbon tetrachloride	1	ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13
1,2-Dichloropropane	1	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14
Dibromochloromethane	1	ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15
1,1,2-Trichloroethane	3	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14
Tetrachloroethene	1	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18
Chlorobenzene	50	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18
Trichlorofluoromethane	2000	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
1,2-Dichloroethane	2	ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13
1,1,1-Trichloroethane	30	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
Bromodichloromethane	1	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19
trans-1,3-Dichloropropene		ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
cis-1,3-Dichloropropene		ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14
1,3-Dichloropropene, Total	1	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14
Bromoform	4	ND		0.25	ND		0.25	ND		0.25	ND		0.25	ND		0.25
1,1,2,2-Tetrachloroethane	1	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17
Benzene	1	**2.3**		**0.08**	ND		0.08	ND		0.08	**12**		**0.08**	ND		0.08
Toluene	600	ND		0.2	ND		0.2	ND		0.2	4.5		0.2	ND		0.2
Ethylbenzene	700	ND		0.17	ND		0.17	ND		0.17	42		0.17	ND		0.17
Chloromethane		ND		0.2	ND		0.2	ND		0.2	ND		0.2	ND		0.2
Bromomethane	10	ND		0.26	ND		0.26	ND		0.26	ND		0.26	ND		0.26
Vinyl chloride	1	ND		0.07	ND		0.07	ND		0.07	ND		0.07	ND		0.07
Chloroethane		ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13
1,1-Dichloroethene	1	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17
trans-1,2-Dichloroethene	100	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
Trichloroethene	1	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18
1,2-Dichlorobenzene	600	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18
1,3-Dichlorobenzene	600	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19
1,4-Dichlorobenzene	75	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19
Methyl tert butyl ether	70	ND		0.17	1.2		0.17	0.69	J	0.17	ND		0.17	1.4		0.17
p/m-Xylene		ND		0.33	ND		0.33	ND		0.33	100		0.33	ND		0.33
o-Xylene		ND		0.39	ND		0.39	ND		0.39	43		0.39	ND		0.39
Xylenes, Total	1000	ND		0.33	ND		0.33	ND		0.33	140		0.33	ND		0.33
cis-1,2-Dichloroethene	70	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19
1,2-Dichloroethene, Total		ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
Styrene	100	ND		0.36	ND		0.36	ND		0.36	ND		0.36	ND		0.36
Dichlorodifluoromethane	1000	ND		0.24	ND		0.24	ND		0.24	ND		0.24	ND		0.24
Acetone	6000	ND		1.5	ND		1.5	ND		1.5	ND		1.5	ND		1.5
Carbon disulfide	700	ND		0.3	0.94	J	0.3	ND		0.3	0.62	J	0.3	ND		0.3
2-Butanone	300	ND		1.9	ND		1.9	ND		1.9	ND		1.9	ND		1.9
4-Methyl-2-pentanone		ND		0.42	ND		0.42	ND		0.42	ND		0.42	ND		0.42
2-Hexanone	40	ND		0.52	ND		0.52	ND		0.52	ND		0.52	ND		0.52
Bromochloromethane		ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15
Isopropylbenzene	700	0.61		0.19	ND		0.19	ND		0.19	11		0.19	ND		0.19
1,2,3-Trichlorobenzene		ND		0.23	ND		0.23	ND		0.23	ND		0.23	ND		0.23
1,2,4-Trichlorobenzene	9	ND		0.22	ND		0.22	ND		0.22	ND		0.22	ND		0.22
Methyl Acetate	7000	ND		0.23	ND		0.23	ND		0.23	ND		0.23	ND		0.23
Cyclohexane		ND		0.27	ND		0.27	ND		0.27	15		0.27	ND		0.27
Tert-Butyl Alcohol	100	13		1.4	ND		1.4	ND		1.4	3.7	J	1.4	ND		1.4
Methyl cyclohexane		ND		0.4	ND		0.4	ND		0.4	18		0.4	ND		0.4
Freon-113	20000	ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15
VOLATILE ORGANICS BY GC/MS-TIC																
Total TIC Compounds		49.3	J	0	4.06	J	0	2.25	J	0	96.3	J	0	4.31	J	0
SEMIVOLATILE ORGANICS BY GC/MS																
Acenaphthene	400	ND		0.44	ND		0.44	ND		0.44	ND		0.44	ND		0.44
3-Methylphenol/4-Methylphenol	50	ND		0.48	ND		0.48	ND		0.48	ND		0.48	ND		0.48
Bis(2-chloroethyl)ether	7	ND		0.5	ND		0.5	ND		0.5	ND		0.5	ND		0.5
2-Chloronaphthalene	600	ND		0.44	ND		0.44	ND		0.44	ND		0.44	ND		0.44
2,4-Dinitrotoluene	10	ND		1.2	ND		1.2	ND		1.2	ND		1.2	ND		1.2
2,6-Dinitrotoluene	10	ND		0.93	ND		0.93	ND		0.93	ND		0.93	ND		0.93
Fluoranthene	300	ND		0.26	ND		0.26	ND		0.26	ND		0.26	ND		0.26
4-Chlorophenyl phenyl ether		ND		0.49	ND		0.49	ND		0.49	ND		0.49	ND		0.49
Bis(2-chloroisopropyl)ether	300	ND		0.53	ND		0.53	ND		0.53	ND		0.53	ND		0.53
Bis(2-chloroethoxy)methane		ND		0.5	ND		0.5	ND		0.5	ND		0.5	ND		0.5

Client Sample ID:	SC-2DD			SC-2DDD			SC-3			SC-3D			SC-3DD		
Lab Sample ID:	L2166830-05			L2166830-06			L2166830-11			L2166830-09			L2166830-10		
Date Sampled:	12/6/2021			12/6/2021			12/6/2021			12/6/2021			12/6/2021		
Matrix:	WATER			WATER			WATER			WATER			WATER		
ANALYTE	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
VOLATILE ORGANICS BY GC/MS															
1,2-Dibromo-3-chloropropane	ND		0.35	ND		0.35	ND		0.35	ND		0.35	ND		0.35
1,2-Dibromoethane	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19
Methylene chloride	ND		0.68	ND		0.68	ND		0.68	ND		0.68	ND		0.68
1,1-Dichloroethane	ND		0.21	ND		0.21	ND		0.21	0.29	J	0.21	ND		0.21
Chloroform	ND		0.22	ND		0.22	ND		0.22	ND		0.22	ND		0.22
Carbon tetrachloride	ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13
1,2-Dichloropropane	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14
Dibromochloromethane	ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15
1,1,2-Trichloroethane	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14
Tetrachloroethene	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18
Chlorobenzene	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18
Trichlorofluoromethane	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
1,2-Dichloroethane	ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13
1,1,1-Trichloroethane	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
Bromodichloromethane	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19
trans-1,3-Dichloropropene	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
cis-1,3-Dichloropropene	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14
1,3-Dichloropropene, Total	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14
Bromoform	ND		0.25	ND		0.25	ND		0.25	ND		0.25	ND		0.25
1,1,2,2-Tetrachloroethane	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17
Benzene	ND		0.08	ND		0.08	ND		0.08	ND		0.08	ND		0.08
Toluene	ND		0.2	ND		0.2	ND		0.2	ND		0.2	ND		0.2
Ethylbenzene	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17
Chloromethane	ND		0.2	ND		0.2	ND		0.2	ND		0.2	ND		0.2
Bromomethane	ND		0.26	ND		0.26	ND		0.26	ND		0.26	ND		0.26
Vinyl chloride	ND		0.07	ND		0.07	ND		0.07	0.1	J	0.07	ND		0.07
Chloroethane	ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13
1,1-Dichloroethene	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17
trans-1,2-Dichloroethene	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
Trichloroethene	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18
1,2-Dichlorobenzene	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18
1,3-Dichlorobenzene	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19
1,4-Dichlorobenzene	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19
Methyl tert butyl ether	ND		0.17	ND		0.17	ND		0.17	**120**		**0.17**	2.4		0.17
p/m-Xylene	ND		0.33	ND		0.33	ND		0.33	ND		0.33	ND		0.33
o-Xylene	ND		0.39	ND		0.39	ND		0.39	ND		0.39	ND		0.39
Xylenes, Total	ND		0.33	ND		0.33	ND		0.33	ND		0.33	ND		0.33
cis-1,2-Dichloroethene	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19
1,2-Dichloroethene, Total	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
Styrene	ND		0.36	ND		0.36	ND		0.36	ND		0.36	ND		0.36
Dichlorodifluoromethane	ND		0.24	ND		0.24	ND		0.24	ND		0.24	ND		0.24
Acetone	ND		1.5	ND		1.5	ND		1.5	ND		1.5	ND		1.5
Carbon disulfide	0.75	J	0.3	0.54	J	0.3	ND		0.3	0.5	J	0.3	0.3	J	0.3
2-Butanone	ND		1.9	ND		1.9	ND		1.9	ND		1.9	ND		1.9
4-Methyl-2-pentanone	ND		0.42	ND		0.42	ND		0.42	ND		0.42	ND		0.42
2-Hexanone	ND		0.52	ND		0.52	ND		0.52	ND		0.52	ND		0.52
Bromochloromethane	ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15
Isopropylbenzene	ND		0.19	ND		0.19	0.47	J	0.19	ND		0.19	ND		0.19
1,2,3-Trichlorobenzene	ND		0.23	ND		0.23	ND		0.23	ND		0.23	ND		0.23
1,2,4-Trichlorobenzene	ND		0.22	ND		0.22	ND		0.22	ND		0.22	ND		0.22
Methyl Acetate	ND		0.23	ND		0.23	ND		0.23	160		0.23	ND		0.23
Cyclohexane	ND		0.27	ND		0.27	0.38	J	0.27	ND		0.27	ND		0.27
Tert-Butyl Alcohol	ND		1.4	ND		1.4	1.7	J	1.4	**270**		**1.4**	5.7	J	1.4
Methyl cyclohexane	ND		0.4	ND		0.4	ND		0.4	ND		0.4	ND		0.4
Freon-113	ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15
VOLATILE ORGANICS BY GC/MS-TIC															
Total TIC Compounds	5.26	J	0	4.73	J	0	13.9	J	0	5.65	J	0	5.78	J	0
SEMIVOLATILE ORGANICS BY GC/MS															
Acenaphthene	ND		0.44	ND		0.44	ND		0.44	ND		0.44	ND		0.44
3-Methylphenol/4-Methylphenol	ND		0.48	ND		0.48	ND		0.48	ND		0.48	ND		0.48
Bis(2-chloroethyl)ether	ND		0.5	ND		0.5	ND		0.5	ND		0.5	ND		0.5
2-Chloronaphthalene	ND		0.44	ND		0.44	ND		0.44	ND		0.44	ND		0.44
2,4-Dinitrotoluene	ND		1.2	ND		1.2	ND		1.2	ND		1.2	ND		1.2
2,6-Dinitrotoluene	ND		0.93	ND		0.93	ND		0.93	ND		0.93	ND		0.93
Fluoranthene	ND		0.26	ND		0.26	ND		0.26	ND		0.26	ND		0.26
4-Chlorophenyl phenyl ether	ND		0.49	ND		0.49	ND		0.49	ND		0.49	ND		0.49
Bis(2-chloroisopropyl)ether	ND		0.53	ND		0.53	ND		0.53	ND		0.53	ND		0.53
Bis(2-chloroethoxy)methane	ND		0.5	ND		0.5	ND		0.5	ND		0.5	ND		0.5

Client Sample ID:	SC-3DDD			SC-4			SC-4D			SC-4DD		
Lab Sample ID:	L2167075-04			L2166830-08			L2167075-02			L2167075-03		
Date Sampled:	12/7/2021			12/6/2021			12/7/2021			12/7/2021		
Matrix:	WATER			WATER			WATER			WATER		
ANALYTE	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
VOLATILE ORGANICS BY GC/MS												
1,2-Dibromo-3-chloropropane	ND		0.35	ND		0.35	ND		0.35	ND		0.35
1,2-Dibromoethane	ND		0.19	ND		0.19	ND		0.19	ND		0.19
Methylene chloride	ND		0.68	ND		0.68	ND		0.68	ND		0.68
1,1-Dichloroethane	ND		0.21	ND		0.21	2.6		0.21	1		0.21
Chloroform	ND		0.22	ND		0.22	ND		0.22	ND		0.22
Carbon tetrachloride	ND		0.13	ND		0.13	ND		0.13	ND		0.13
1,2-Dichloropropane	ND		0.14	ND		0.14	0.23	J	0.14	ND		0.14
Dibromochloromethane	ND		0.15	ND		0.15	ND		0.15	ND		0.15
1,1,2-Trichloroethane	ND		0.14	ND		0.14	ND		0.14	ND		0.14
Tetrachloroethene	ND		0.18	ND		0.18	ND		0.18	ND		0.18
Chlorobenzene	ND		0.18	ND		0.18	ND		0.18	ND		0.18
Trichlorofluoromethane	ND		0.16	ND		0.16	ND		0.16	ND		0.16
1,2-Dichloroethane	ND		0.13	ND		0.13	ND		0.13	ND		0.13
1,1,1-Trichloroethane	ND		0.16	ND		0.16	ND		0.16	ND		0.16
Bromodichloromethane	ND		0.19	ND		0.19	ND		0.19	ND		0.19
trans-1,3-Dichloropropene	ND		0.16	ND		0.16	ND		0.16	ND		0.16
cis-1,3-Dichloropropene	ND		0.14	ND		0.14	ND		0.14	ND		0.14
1,3-Dichloropropene, Total	ND		0.14	ND		0.14	ND		0.14	ND		0.14
Bromoform	ND		0.25	ND		0.25	ND		0.25	ND		0.25
1,1,2,2-Tetrachloroethane	ND		0.17	ND		0.17	ND		0.17	ND		0.17
Benzene	ND		0.08	ND		0.08	ND		0.08	ND		0.08
Toluene	ND		0.2	ND		0.2	ND		0.2	ND		0.2
Ethylbenzene	ND		0.17	ND		0.17	ND		0.17	ND		0.17
Chloromethane	ND		0.2	ND		0.2	ND		0.2	ND		0.2
Bromomethane	0.69	J	0.26	ND		0.26	0.35	J	0.26	0.72	J	0.26
Vinyl chloride	ND		0.07	ND		0.07	0.14	J	0.07	0.2		0.07
Chloroethane	ND		0.13	ND		0.13	ND		0.13	ND		0.13
1,1-Dichloroethene	ND		0.17	ND		0.17	ND		0.17	ND		0.17
trans-1,2-Dichloroethene	ND		0.16	ND		0.16	ND		0.16	ND		0.16
Trichloroethene	ND		0.18	ND		0.18	ND		0.18	ND		0.18
1,2-Dichlorobenzene	ND		0.18	ND		0.18	ND		0.18	ND		0.18
1,3-Dichlorobenzene	ND		0.19	ND		0.19	ND		0.19	ND		0.19
1,4-Dichlorobenzene	ND		0.19	ND		0.19	ND		0.19	ND		0.19
Methyl tert butyl ether	ND		0.17	0.29	J	0.17	0.48	J	0.17	8.9		0.17
p/m-Xylene	ND		0.33	ND		0.33	ND		0.33	ND		0.33
o-Xylene	ND		0.39	ND		0.39	ND		0.39	ND		0.39
Xylenes, Total	ND		0.33	ND		0.33	ND		0.33	ND		0.33
cis-1,2-Dichloroethene	ND		0.19	ND		0.19	ND		0.19	ND		0.19
1,2-Dichloroethene, Total	ND		0.16	ND		0.16	ND		0.16	ND		0.16
Styrene	ND		0.36	ND		0.36	ND		0.36	ND		0.36
Dichlorodifluoromethane	ND		0.24	ND		0.24	ND		0.24	ND		0.24
Acetone	ND		1.5	ND		1.5	ND		1.5	ND		1.5
Carbon disulfide	ND		0.3	0.54	J	0.3	ND		0.3	ND		0.3
2-Butanone	ND		1.9	ND		1.9	ND		1.9	ND		1.9
4-Methyl-2-pentanone	ND		0.42	ND		0.42	ND		0.42	ND		0.42
2-Hexanone	ND		0.52	ND		0.52	ND		0.52	ND		0.52
Bromochloromethane	ND		0.15	ND		0.15	ND		0.15	ND		0.15
Isopropylbenzene	ND		0.19	ND		0.19	ND		0.19	ND		0.19
1,2,3-Trichlorobenzene	ND		0.23	ND		0.23	ND		0.23	ND		0.23
1,2,4-Trichlorobenzene	ND		0.22	ND		0.22	ND		0.22	ND		0.22
Methyl Acetate	ND		0.23	ND		0.23	ND		0.23	ND		0.23
Cyclohexane	ND		0.27	ND		0.27	ND		0.27	ND		0.27
Tert-Butyl Alcohol	6.9	J	1.4	ND		1.4	88		1.4	**140**		**1.4**
Methyl cyclohexane	ND		0.4	ND		0.4	ND		0.4	ND		0.4
Freon-113	ND		0.15	ND		0.15	ND		0.15	ND		0.15
VOLATILE ORGANICS BY GC/MS-TIC												
Total TIC Compounds	-		-	5.53	J	0	-		-	-		-
SEMIVOLATILE ORGANICS BY GC/MS												
Acenaphthene	ND		0.44	ND		0.44	ND		0.44	ND		0.44
3-Methylphenol/4-Methylphenol	ND		0.48	ND		0.48	ND		0.48	ND		0.48
Bis(2-chloroethyl)ether	ND		0.5	ND		0.5	ND		0.5	ND		0.5
2-Chloronaphthalene	ND		0.44	ND		0.44	ND		0.44	ND		0.44
2,4-Dinitrotoluene	ND		1.2	ND		1.2	ND		1.2	ND		1.2
2,6-Dinitrotoluene	ND		0.93	ND		0.93	ND		0.93	ND		0.93
Fluoranthene	ND		0.26	ND		0.26	ND		0.26	ND		0.26
4-Chlorophenyl phenyl ether	ND		0.49	ND		0.49	ND		0.49	ND		0.49
Bis(2-chloroisopropyl)ether	ND		0.53	ND		0.53	ND		0.53	ND		0.53
Bis(2-chloroethoxy)methane	ND		0.5	ND		0.5	ND		0.5	ND		0.5

Table 6
Hess Corporation Former Port Reading Complex
750 Cliff Road, Port Reading NJ
PSEG- Groundwater Analytical Results

Client Sample ID:	NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	SC-1		SC-1D		SC-1DD		SC-2		SC-2D		SC-2DD		SC-2DDD		SC-3		SC-3D		SC-3DD		SC-3DDD		SC-4		SC-4D		SC-4DD	
Lab Sample ID:		L2166830-01		L2166830-04		L2166830-02		L2166830-07		L2166830-03		L2166830-05		L2166830-06		L2166830-11		L2166830-09		L2166830-10		L2167075-04		L2166830-08		L2167075-02		L2167075-03	
Date Sampled:		12/6/2021		12/6/2021		12/6/2021		12/6/2021		12/6/2021		12/6/2021		12/6/2021		12/6/2021		12/6/2021		12/6/2021		12/7/2021		12/6/2021		12/7/2021		12/7/2021	
Matrix:		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER	
Hexachlorocyclopentadiene	40	ND	0.69	ND	0.69	ND	0.69	ND	0.69	ND	0.69	ND	0.69	ND	0.69	ND	0.69	ND	0.69	ND	0.69	ND	0.69	ND	0.69	ND	0.69	ND	0.69
Hexachloroethane	7	ND	0.58	ND	0.58	ND	0.58	ND	0.58	ND	0.58	ND	0.58	ND	0.58	ND	0.58	ND	0.58	ND	0.58	ND	0.58	ND	0.58	ND	0.58	ND	0.58
Isophorone	40	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2
Naphthalene	300	ND	0.46	ND	0.46	ND	0.46	5.9	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46
Nitrobenzene	6	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77
NDPA/DPA	10	ND	0.42	ND	0.42	ND	0.42	ND	0.42	ND	0.42	ND	0.42	ND	0.42	ND	0.42	ND	0.42	ND	0.42	ND	0.42	ND	0.42	ND	0.42	ND	0.42
n-Nitrosodi-n-propylamine		ND	0.64	ND	0.64	ND	0.64	ND	0.64	ND	0.64	ND	0.64	ND	0.64	ND	0.64	ND	0.64	ND	0.64	ND	0.64	ND	0.64	ND	0.64	ND	0.64
Bis(2-ethylhexyl)phthalate	3	ND	1.5	ND	1.5	ND	1.5	ND	1.5	ND	1.5	ND	1.5	ND	1.5	ND	1.5	ND	1.5	ND	1.5	1.5 J	1.5	ND	1.5	ND	1.5	ND	1.5
Butyl benzyl phthalate	100	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2
Di-n-butylphthalate	700	ND	0.39	ND	0.39	ND	0.39	ND	0.39	ND	0.39	ND	0.39	ND	0.39	ND	0.39	ND	0.39	ND	0.39	ND	0.39	ND	0.39	ND	0.39	ND	0.39
Di-n-octylphthalate	100	ND	1.3	ND	1.3	ND	1.3	ND	1.3	ND	1.3	ND	1.3	ND	1.3	ND	1.3	ND	1.3	ND	1.3	ND	1.3	ND	1.3	ND	1.3	ND	1.3
Diethyl phthalate	6000	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38
Dimethyl phthalate		ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8
Chrysene	5	ND	0.34	ND	0.34	ND	0.34	ND	0.34	ND	0.34	ND	0.34	ND	0.34	ND	0.34	ND	0.34	ND	0.34	ND	0.34	ND	0.34	ND	0.34	ND	0.34
Acenaphthylene		ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46
Anthracene	2000	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33
Benzo(ghi)perylene		ND	0.3	ND	0.3	ND	0.3	ND	0.3	ND	0.3	ND	0.3	ND	0.3	ND	0.3	ND	0.3	ND	0.3	ND	0.3	ND	0.3	ND	0.3	ND	0.3
Fluorene	300	1 J	0.41	ND	0.41	ND	0.41	0.56 J	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41
Phenanthrene		0.89 J	0.33	ND	0.33	ND	0.33	0.41 J	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33
Pyrene	200	ND	0.28	ND	0.28	ND	0.28	ND	0.28	ND	0.28	ND	0.28	ND	0.28	ND	0.28	ND	0.28	ND	0.28	ND	0.28	ND	0.28	ND	0.28	ND	0.28
4-Chloroaniline	30	ND	1.1	ND	1.1	ND	1.1	ND	1.1	ND	1.1	ND	1.1	ND	1.1	ND	1.1	ND	1.1	ND	1.1	ND	1.1	ND	1.1	ND	1.1	ND	1.1
2-Nitroaniline		ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
3-Nitroaniline		ND	0.81	ND	0.81	ND	0.81	ND	0.81	ND	0.81	ND	0.81	ND	0.81	ND	0.81	ND	0.81	ND	0.81	ND	0.81	ND	0.81	ND	0.81	ND	0.81
4-Nitroaniline		ND	0.8	ND	0.8	ND	0.8	ND	0.8	ND	0.8	ND	0.8	ND	0.8	ND	0.8	ND	0.8	ND	0.8	ND	0.8	ND	0.8	ND	0.8	ND	0.8
Dibenzofuran		ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
2-Methylnaphthalene	30	ND	0.45	ND	0.45	ND	0.45	6.2	0.45	ND	0.45	ND	0.45	ND	0.45	ND	0.45	ND	0.45	ND	0.45	ND	0.45	ND	0.45	ND	0.45	ND	0.45
2,4,6-Trichlorophenol	20	ND	0.61	ND	0.61	ND	0.61	ND	0.61	ND	0.61	ND	0.61	ND	0.61	ND	0.61	ND	0.61	ND	0.61	ND	0.61	ND	0.61	ND	0.61	ND	0.61
p-Chloro-m-cresol		ND	0.35	ND	0.35	ND	0.35	ND	0.35	ND	0.35	ND	0.35	ND	0.35	ND	0.35	ND	0.35	ND	0.35	ND	0.35	ND	0.35	ND	0.35	ND	0.35
2-Chlorophenol	40	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48
2,4-Dichlorophenol	20	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41
2,4-Dimethylphenol	100	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8
2-Nitrophenol		ND	0.85	ND	0.85	ND	0.85	ND	0.85	ND	0.85	ND	0.85	ND	0.85	ND	0.85	ND	0.85	ND	0.85	ND	0.85	ND	0.85	ND	0.85	ND	0.85
4-Nitrophenol		ND	0.67	ND	0.67	ND	0.67	ND	0.67	ND	0.67	ND	0.67	ND	0.67	ND	0.67	ND	0.67	ND	0.67	ND	0.67	ND	0.67	ND	0.67	ND	0.67
2,4-Dinitrophenol	40	ND	6.6	ND	6.6	ND	6.6	ND	6.6	ND	6.6	ND	6.6	ND	6.6	ND	6.6	ND	6.6	ND	6.6	ND	6.6	ND	6.6	ND	6.6	ND	6.6
Phenol	2000	ND	0.57	ND	0.57	ND	0.57	ND	0.57	ND	0.57	ND	0.57	ND	0.57	ND	0.57	ND	0.57	ND	0.57	ND	0.57	ND	0.57	ND	0.57	ND	0.57
2-Methylphenol	50	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49
2,4,5-Trichlorophenol	700	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77
Carbazole		ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49
4-Bromophenyl phenyl ether		ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38
3,3'-Dichlorobenzidine	30	ND	1.6	ND	1.6	ND	1.6	ND	1.6	ND	1.6	ND	1.6	ND	1.6	ND	1.6	ND	1.6	ND	1.6	ND	1.6	ND	1.6	ND	1.6	ND	1.6
Benzaldehyde		ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53
Acetophenone	700	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53
Caprolactam	4000	ND	3.3	ND	3.3	ND	3.3	ND	3.3	ND	3.3	ND	3.3	ND	3.3	ND	3.3	ND	3.3	ND	3.3	ND	3.3	ND	3.3	ND	3.3	ND	3.3
Biphenyl	400	ND	0.46	ND	0.46	ND	0.46	0.56 J	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46
1,2,4,5-Tetrachlorobenzene		ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44
Atrazine	3	ND	0.76	ND	0.76	ND	0.76	ND	0.76	ND	0.76	ND	0.76	ND	0.76	ND	0.76	ND	0.76	ND	0.76	ND	0.76	ND	0.76	ND	0.76	ND	0.76
2,3,4,6-Tetrachlorophenol	200	ND	0.84	ND	0.84	ND	0.84	ND	0.84	ND	0.84	ND	0.84	ND	0.84	ND	0.84	ND	0.84	ND	0.84	ND	0.84	ND	0.84	ND	0.84	ND	0.84
SEMIVOLATILE ORGANICS BY GC/MS-SIM																													
4,6-Dinitro-o-cresol		ND	0.09	ND	0.09	ND	0.09	ND	0.09	ND	0.09	ND	0.09	ND	0.09	ND	0.09	ND	0.09	ND	0.09	ND	0.09	ND	0.09	ND	0.09	ND	0.09
Benzo(a)anthracene	0.1	0.02 J	0.02	0.02 J	0.02	ND	0.02	0.03 J	0.02	0.03 J	0.02	0.05 J	0.02	0.03 J	0.02	ND	0.02	ND	0.02	0.02 J	0.02	0.04 J	0.02	0.02 J	0.02	0.02 J	0.02	ND	0.02
Benzo(a)pyrene	0.1	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	0.04 J	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	0.02 J	0.02	ND	0.02	ND	0.02	ND	0.02
Benzo(b)fluoranthene	0.2	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	0.09 J	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	0.02 J	0.01	ND	0.01	ND	0.01	ND	0.01
Benzo(k)fluoranthene	0.5	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	0.02 J	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	0.02 J	0.01	ND	0.01	ND	0.01	ND	0.01
Dibenzo(a,h)anthracene	0.3	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	0.04 J	0.01	ND	0.01	ND	0.01	ND	0.01
Indeno(1,2,3-cd)pyrene	0.2	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	0.05 J	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	0.03 J	0.01	ND	0.01	ND	0.01	ND	0.01
Hexachlorobenzene	0.02	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	**0.02**	**0.01**
Pentachlorophenol	0.3	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01
Hexachlorobutadiene	1	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05
1,4-Dioxane	0.4	**0.442**	**0.0303**	**0.623**	**0.0303**	**0.59**	**0.0314**	0.0965 J	0.0303	**0.788**	**0.0314**	ND	0.0303	ND	0.0303	ND	0.0314	**3.06**	**0.0326**	0.15	0.0326	ND	0.0314	0.16	0.0339	**37.1**	**0.0314**	**35.2**	**0.0339**
SEMIVOLATILE ORGANICS BY GC/MS-TIC																													
Total TIC Compounds		124 J	0	35.2 J	0	5.52 J	0	1300 J	0	1140 J	0	23.1 J	0	70.9 J	0	135 J	0	91.3 J	0	47.6 J	0	74.4 J	0	60.9 J	0	1030 J	0	47.9 J	0
TOTAL METALS																													
Aluminum, Total	200	71.9 J	32.7	**409**	**3.27**	**501**	**3.27**	102	3.27	**870**	**3.27**	**1580**	**3.27**	141	3.27	5.34 J	3.27	7.64 J	3.27	ND	16.4	18.9 J	16.4	179	3.27	**296**	**3.27**	81.4	3.27
Antimony, Total	6	ND	4.29	ND	0.429	ND	0.429	ND	0.429	ND	0.429	2.907 J	0.429	ND	0.429	ND	0.429	ND	0.429	ND	2.145	ND	2.145	ND	0.429	0.8907 J	0.429	0.446 J	0.429
Arsenic, Total	3	**6.7**	**1.65**	1.129	0.165	0.3704 J	0.165	**5.58**	**0.165**	1.535	0.165	1.996	0.165	0.4041 J	0.165	1.09	0.165	2.324	0.165	ND	0.825	2.666	0.825	0.8239	0.165	**4.976**	**0.165**	**3.875**	**0.165**
Barium, Total	6000	230	1.73	328.8	0.173	452.6	0.173	1541	0.173	150.2	0.173	125	0.173	78.95	0.173	641	0.173	28.63	0.173	79	0.865	116.4	0.865	46.32	0.173	20.09	0.173	125.5	0.173
Beryllium, Total	1	ND	1.07	0.137 J	0.107	0.1506 J	0.107	ND	0.107	ND	0.107	0.1931 J	0.107	0.6155	0.107	ND	0.107	ND	0.107	**1.219 J**	**0.535**	**3.408**	**0.535**	ND	0.107	ND	0.107	ND	0.107
Cadmium, Total	4	ND	0.599	ND	0.0599	ND	0.0599	ND	0.0599	ND	0.0599	0.1808 J	0.0599	ND	0.0599	ND	0.0599	ND	0.0599	ND	0.2995	ND	0.2995	ND	0.0599	ND	0.0599	ND	0.0599
Calcium, Total		100000	394	76700	39.4	120000	39.4	46900	39.4	103000	39.4	46000	39.4	51100	39.4	87400	39.4	48900	39.4	902000	197	1470000	197	61800	39.4	31500	39.4	50000	39.4
Chromium, Total	70	2.025 J	1.78	1.528	0.178	2.315	0.178	2.314	0.178	3.065	0.178	4.565	0.178	1.276	0.178	0.8222 J	0.178	0.492 J	0.178	ND	0.89	ND	0.89	2.706	0.178	2.203	0.178	0.4093 J	0.178

Table 6
Hess Corporation Former Port Reading Complex
750 Cliff Road, Port Reading NJ
PSEG- Groundwater Analytical Results

Client Sample ID:	NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	SC-1			SC-1D			SC-1DD			SC-2			SC-2D			SC-2DD		
Lab Sample ID:		L2166830-01			L2166830-04			L2166830-02			L2166830-07			L2166830-03			L2166830-05		
Date Sampled:		12/6/2021			12/6/2021			12/6/2021			12/6/2021			12/6/2021			12/6/2021		
Matrix:		WATER			WATER			WATER			WATER			WATER			WATER		
Cobalt, Total	100	72.36		1.63	1.861		0.163	1.121		0.163	1.838		0.163	0.9199		0.163	1.308		0.163
Copper, Total	1300	ND		3.84	7.764		0.384	3.713		0.384	0.4023	J	0.384	4.662		0.384	45.22		0.384
Iron, Total	300	**137000**		**191**	**1770**		**19.1**	**5240**		**19.1**	**109000**		**19.1**	**2200**		**19.1**	**16000**		**19.1**
Lead, Total	5	ND		3.43	1.542		0.343	1.016		0.343	ND		0.343	2.013		0.343	**28.28**		**0.343**
Magnesium, Total		263000		242	13700		24.2	18000		24.2	84100		24.2	114000		24.2	8340		24.2
Manganese, Total	50	**8568**		**4.4**	38.9		0.44	**105.7**		**0.44**	**768.7**		**0.44**	**78.92**		**0.44**	**442**		**0.44**
Mercury, Total	2	ND		0.0915	ND		0.0915	ND		0.0915	ND		0.0915	0.121	J	0.0915	0.174	J	0.0915
Nickel, Total	100	ND		5.56	2.061		0.556	2.328		0.556	ND		0.556	1.467	J	0.556	3.71		0.556
Potassium, Total		95600		309	3910		30.9	2140		30.9	54600		30.9	27000		30.9	7350		30.9
Selenium, Total	40	ND		17.3	ND		1.73	ND		1.73	ND		1.73	ND		1.73	ND		1.73
Silver, Total	40	ND		1.63	ND		0.163	ND		0.163	ND		0.163	ND		0.163	0.9367		0.163
Sodium, Total	50000	**2610000**		**293**	**86400**		**29.3**	43300		29.3	**1330000**		**293**	**865000**		**293**	**182000**		**29.3**
Thallium, Total	2	1.727	J	1.43	0.1793	J	0.143	ND		0.143	ND		0.143	ND		0.143	ND		0.143
Vanadium, Total		ND		15.7	3.393	J	1.57	2.653	J	1.57	6.505		1.57	3.916	J	1.57	4.141	J	1.57
Zinc, Total	2000	71.65	J	34.1	11.87		3.41	12.73		3.41	ND		3.41	12.66		3.41	28.76		3.41
GENERAL CHEMISTRY																			
Nitrogen, Ammonia	3000	**27700**		**240**	1000		48	107	J	48	**14100**		**48**	**3010**		**48**	322	J	120

Client Sample ID:	NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	SC-2DDD			SC-3			SC-3D			SC-3DD			SC-3DDD			SC-4			SC-4D			SC-4DD		
Lab Sample ID:		L2166830-06			L2166830-11			L2166830-09			L2166830-10			L2167075-04			L2166830-08			L2167075-02			L2167075-03		
Date Sampled:		12/6/2021			12/6/2021			12/6/2021			12/6/2021			12/7/2021			12/6/2021			12/7/2021			12/7/2021		
Matrix:		WATER			WATER			WATER			WATER			WATER			WATER			WATER			WATER		
Cobalt, Total	100	16.19		0.163	0.2381	J	0.163	ND		0.163	1.937	J	0.815	3.461		0.815	0.2445	J	0.163	0.1843	J	0.163	0.3932	J	0.163
Copper, Total	1300	2.764		0.384	ND		0.384	ND		0.384	ND		1.92	11.67		1.92	1.107		0.384	2.118		0.384	2.526		0.384
Iron, Total	300	**43900**		**19.1**	**22200**		**19.1**	**2760**		**19.1**	**733000**		**95.5**	**961000**		**95.5**	**12500**		**19.1**	**1640**		**19.1**	**4700**		**19.1**
Lead, Total	5	0.423	J	0.343	ND		0.343	ND		0.343	ND		1.715	ND		1.715	1.675		0.343	0.8191	J	0.343	0.3543	J	0.343
Magnesium, Total		13600		24.2	79400		24.2	122000		24.2	260000		121	321000		121	20900		24.2	105000		24.2	145000		24.2
Manganese, Total	50	**990**		**0.44**	**2046**		**0.44**	**111**		**0.44**	**16230**		**2.2**	**20940**		**2.2**	**204.1**		**0.44**	**76.83**		**0.44**	**194.8**		**0.44**
Mercury, Total	2	ND		0.0915	0.17	J	0.0915	0.179	J	0.0915	0.272		0.0915	ND		0.0915	ND		0.0915	ND		0.0915	ND		0.0915
Nickel, Total	100	0.7787	J	0.556	ND		0.556	ND		0.556	ND		2.78	ND		2.78	1.406	J	0.556	5.532		0.556	3.713		0.556
Potassium, Total		5180		30.9	27900		30.9	50000		30.9	54500		154	27900		154	57700		30.9	44400		30.9	48100		30.9
Selenium, Total	40	ND		1.73	ND		1.73	ND		1.73	ND		8.65	ND		8.65	ND		1.73	ND		1.73	ND		1.73
Silver, Total	40	ND		0.163	ND		0.163	ND		0.163	ND		0.815	ND		0.815	ND		0.163	ND		0.163	ND		0.163
Sodium, Total	50000	**97100**		**29.3**	**1000000**		**293**	**742000**		**293**	**2490000**		**146**	**2050000**		**146**	**329000**		**29.3**	**853000**		**293**	**1140000**		**293**
Thallium, Total	2	ND		0.143	ND		0.143	ND		0.143	ND		0.715	ND		0.715	ND		0.143	0.2295	J	0.143	ND		0.143
Vanadium, Total		ND		1.57	2.052	J	1.57	ND		1.57	ND		7.85	ND		7.85	ND		1.57	3.286	J	1.57	ND		1.57
Zinc, Total	2000	8.333	J	3.41	ND		3.41	ND		3.41	55.94		17.05	58.01		17.05	ND		3.41	ND		3.41	11.64		3.41
GENERAL CHEMISTRY																									
Nitrogen, Ammonia	3000	128	J	48	**3980**		**24**	**4540**		**24**	656		24	461		24	2930		24	**3090**		**48**	**5820**		**24**

Table 7
Hess Corporation Former Port Reading Complex
750 Cliff Road, Port Reading NJ
AOC 12 - Detention Basin/Smith Creek
2021 - Groundwater Analytical Results

Client Sample ID:	NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	SM-1			PER-2DD			PER-2			PER-2D			PER-3			PER-3D			PER-9			PER-9D			PER-9DD			PER-10			PER-10D		
Lab Sample ID:		L2168383-04			L2166615-05			L2166615-07			L2166615-06			L2167782-04			L2167782-03			L2168151-03			L2168151-02			L2168151-01			L2166200-10			L2166200-11		
Date Sampled:		12/13/2021			12/3/2021			12/3/2021			12/3/2021			12/9/2021			12/9/2021			12/10/2021			12/10/2021			12/10/2021			12/2/2021			12/2/2021		
Matrix:		WATER			WATER			WATER			WATER			WATER			WATER			WATER			WATER			WATER			WATER			WATER		
ANALYTE	(ug/l)	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
VOLATILE ORGANICS BY GC/MS																																		
1,2-Dibromo-3-chloropropane	0.02	ND		0.35	ND		0.35	ND		0.35	ND		1.4	ND		0.35	ND		0.35	ND		0.35	ND		0.35	ND		0.35	ND		0.35	ND		0.35
1,2-Dibromoethane	0.03	ND		0.19	ND		0.19	ND		0.19	ND		0.77	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19
Methylene chloride	3	ND		0.68	ND		0.68	ND		0.68	ND		2.7	ND		0.68	ND		0.68	ND		0.68	ND		0.68	ND		0.68	ND		0.68	ND		0.68
1,1-Dichloroethane	50	ND		0.21	ND		0.21	ND		0.21	ND		0.84	ND		0.21	ND		0.21	ND		0.21	0.3	J	0.21	ND		0.21	ND		0.21	0.58	J	0.21
Chloroform	70	ND		0.22	ND		0.22	ND		0.22	ND		0.89	ND		0.22	ND		0.22	ND		0.22	ND		0.22	ND		0.22	ND		0.22	ND		0.22
Carbon tetrachloride	1	ND		0.13	ND		0.13	ND		0.13	ND		0.54	ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13
1,2-Dichloropropane	1	ND		0.14	ND		0.14	ND		0.14	ND		0.55	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14	0.48	J	0.14
Dibromochloromethane	1	ND		0.15	ND		0.15	ND		0.15	ND		0.6	ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15
1,1,2-Trichloroethane	3	ND		0.14	ND		0.14	ND		0.14	ND		0.58	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14
Tetrachloroethene	1	ND		0.18	ND		0.18	ND		0.18	ND		0.72	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18
Chlorobenzene	50	0.49	J	0.18	ND		0.18	ND		0.18	ND		0.71	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18
Trichlorofluoromethane	2000	ND		0.16	ND		0.16	ND		0.16	ND		0.64	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
1,2-Dichloroethane	2	ND		0.13	ND		0.13	ND		0.13	ND		0.53	ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13
1,1,1-Trichloroethane	30	ND		0.16	ND		0.16	ND		0.16	ND		0.63	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
Bromodichloromethane	1	ND		0.19	ND		0.19	ND		0.19	ND		0.77	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19
trans-1,3-Dichloropropene		ND		0.16	ND		0.16	ND		0.16	ND		0.66	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
cis-1,3-Dichloropropene		ND		0.14	ND		0.14	ND		0.14	ND		0.58	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14
1,3-Dichloropropene, Total	1	ND		0.14	ND		0.14	ND		0.14	ND		0.58	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14
Bromoform	4	ND		0.25	ND		0.25	ND		0.25	ND		0.99	ND		0.25	ND		0.25	ND		0.25	ND		0.25	ND		0.25	ND		0.25	ND		0.25
1,1,2,2-Tetrachloroethane	1	ND		0.17	ND		0.17	ND		0.17	ND		0.67	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17
Benzene	1	ND		0.08	ND		0.08	ND		0.08	ND		0.32	ND		0.08	ND		0.08	ND		0.08	ND		0.08	ND		0.08	0.09	J	0.08	ND		0.08
Toluene	600	ND		0.2	ND		0.2	ND		0.2	ND		0.81	ND		0.2	ND		0.2	ND		0.2	ND		0.2	ND		0.2	ND		0.2	ND		0.2
Ethylbenzene	700	ND		0.17	ND		0.17	ND		0.17	ND		0.67	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17
Chloromethane		ND		0.2	ND		0.2	ND		0.2	ND		0.8	ND		0.2	ND		0.2	ND		0.2	ND		0.2	ND		0.2	ND		0.2	ND		0.2
Bromomethane	10	ND		0.26	ND		0.26	ND		0.26	ND		1	ND		0.26	ND		0.26	ND		0.26	ND		0.26	ND		0.26	0.28	J	0.26	0.26	J	0.26
Vinyl chloride	1	ND		0.07	ND		0.07	ND		0.07	ND		0.28	ND		0.07	ND		0.07	ND		0.07	ND		0.07	ND		0.07	ND		0.07	ND		0.07
Chloroethane		ND		0.13	ND		0.13	ND		0.13	ND		0.54	ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13
1,1-Dichloroethene	1	ND		0.17	ND		0.17	ND		0.17	ND		0.68	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17
trans-1,2-Dichloroethene	100	ND		0.16	ND		0.16	ND		0.16	ND		0.65	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
Trichloroethene	1	ND		0.18	ND		0.18	ND		0.18	ND		0.7	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18
1,2-Dichlorobenzene	600	ND		0.18	ND		0.18	ND		0.18	ND		0.74	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18
1,3-Dichlorobenzene	600	ND		0.19	ND		0.19	ND		0.19	ND		0.74	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19
1,4-Dichlorobenzene	75	ND		0.19	ND		0.19	ND		0.19	ND		0.75	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19
Methyl tert butyl ether	70	0.48	J	0.17	23		0.17	ND		0.17	**680**		**0.66**	ND		0.17	55		0.17	ND		0.17	47		0.17	1.7		0.17	ND		0.17	**100**		**0.17**
p/m-Xylene		ND		0.33	ND		0.33	ND		0.33	ND		1.3	ND		0.33	ND		0.33	ND		0.33	ND		0.33	ND		0.33	ND		0.33	ND		0.33
o-Xylene		ND		0.39	ND		0.39	ND		0.39	ND		1.6	ND		0.39	ND		0.39	ND		0.39	ND		0.39	ND		0.39	ND		0.39	ND		0.39
Xylenes, Total	1000	ND		0.33	ND		0.33	ND		0.33	ND		1.3	ND		0.33	ND		0.33	ND		0.33	ND		0.33	ND		0.33	ND		0.33	ND		0.33
cis-1,2-Dichloroethene	70	ND		0.19	ND		0.19	ND		0.19	ND		0.75	ND		0.19	0.2	J	0.19	ND		0.19	0.4	J	0.19	ND		0.19	ND		0.19	ND		0.19
1,2-Dichloroethene, Total		ND		0.16	ND		0.16	ND		0.16	ND		0.65	ND		0.16	0.2	J	0.16	ND		0.16	0.4	J	0.16	ND		0.16	ND		0.16	ND		0.16
Styrene	100	ND		0.36	ND		0.36	ND		0.36	ND		1.4	ND		0.36	ND		0.36	ND		0.36	ND		0.36	ND		0.36	ND		0.36	ND		0.36
Dichlorodifluoromethane	1000	ND		0.24	ND		0.24	ND		0.24	ND		0.98	ND		0.24	ND		0.24	ND		0.24	ND		0.24	ND		0.24	ND		0.24	ND		0.24
Acetone	6000	ND		1.5	ND		1.5	1.6	J	1.5	ND		5.8	ND		1.5	ND		1.5	1.6	J	1.5	ND		1.5	ND		1.5	1.9	J	1.5	ND		1.5
Carbon disulfide	700	ND		0.3	ND		0.3	ND		0.3	ND		1.2	0.43	J	0.3	ND		0.3	ND		0.3	ND		0.3	ND		0.3	ND		0.3	ND		0.3
2-Butanone	300	ND		1.9	ND		1.9	ND		1.9	ND		7.8	ND		1.9	ND		1.9	ND		1.9	ND		1.9	ND		1.9	ND		1.9	ND		1.9
4-Methyl-2-pentanone		ND		0.42	ND		0.42	ND		0.42	ND		1.7	ND		0.42	ND		0.42	ND		0.42	ND		0.42	ND		0.42	ND		0.42	ND		0.42
2-Hexanone	40	ND		0.52	ND		0.52	ND		0.52	ND		2.1	ND		0.52	ND		0.52	ND		0.52	ND		0.52	ND		0.52	ND		0.52	ND		0.52
Bromochloromethane		ND		0.15	ND		0.15	ND		0.15	ND		0.61	ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15
Isopropylbenzene	700	ND		0.19	ND		0.19	ND		0.19	ND		0.75	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19
1,2,3-Trichlorobenzene		ND		0.23	ND		0.23	ND		0.23	ND		0.94	ND		0.23	ND		0.23	ND		0.23	ND		0.23	ND		0.23	ND		0.23	ND		0.23
1,2,4-Trichlorobenzene	9	ND		0.22	ND		0.22	ND		0.22	ND		0.88	ND		0.22	ND		0.22	ND		0.22	ND		0.22	ND		0.22	ND		0.22	ND		0.22
Methyl Acetate	7000	ND		0.23	ND		0.23	ND		0.23	ND		0.94	ND		0.23	ND		0.23	ND		0.23	ND		0.23	ND		0.23	ND		0.23	ND		0.23
Cyclohexane		ND		0.27	ND		0.27	0.33	J	0.27	ND		1.1	ND		0.27	ND		0.27	ND		0.27	ND		0.27	ND		0.27	0.66	J	0.27	ND		0.27
Tert-Butyl Alcohol	100	12		1.4	**420**		**1.4**	ND		1.4	61		5.6	8.3	J	1.4	**160**		**1.4**	5.3	J	1.4	**4400**	**E**	**1.4**	20		1.4	2.1	J	1.4	**100**		**1.4**
Methyl cyclohexane		ND		0.4	ND		0.4	ND		0.4	ND		1.6	ND		0.4	ND		0.4	ND		0.4	ND		0.4	ND		0.4	ND		0.4	ND		0.4

Table 7
Hess Corporation Former Port Reading Complex
750 Cliff Road, Port Reading NJ
AOC 12 - Detention Basin/Smith Creek
Groundwater Analytical Results

Client Sample ID:	NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	SM-1		PER-2DD		PER-2		PER-2D		PER-3		PER-3D		PER-9		PER-9D		PER-9DD		PER-10		PER-10D	
Lab Sample ID:		L2168383-04		L2166615-05		L2166615-07		L2166615-06		L2167782-04		L2167782-03		L2168151-03		L2168151-02		L2168151-01		L2166200-10		L2166200-11	
Date Sampled:		12/13/2021		12/3/2021		12/3/2021		12/3/2021		12/9/2021		12/9/2021		12/10/2021		12/10/2021		12/10/2021		12/2/2021		12/2/2021	
Matrix:		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER	
Freon-113	20000	ND	0.15	ND	0.15	ND	0.15	ND	0.59	ND	0.15	ND	0.15	ND	0.15	ND	0.15	ND	0.15	ND	0.15	ND	0.15
VOLATILE ORGANICS BY GC/MS-TIC																							
Total TIC Compounds		-	-	-	-	1.03 J	0	-	-	2.59 J	0	1.08 J	0	-	-	-	-	-	-	2.82 J	0	3.52 J	0
SEMIVOLATILE ORGANICS BY GC/MS																							
Acenaphthene	400	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44
3-Methylphenol/4-Methylphenol	50	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48
Bis(2-chloroethyl)ether	7	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
2-Chloronaphthalene	600	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44
2,4-Dinitrotoluene	10	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2
2,6-Dinitrotoluene	10	ND	0.93	ND	0.93	ND	0.93	ND	0.93	ND	0.93	ND	0.93	ND	0.93	ND	0.93	ND	0.93	ND	0.93	ND	0.93
Fluoranthene	300	ND	0.26	ND	0.26	ND	0.26	ND	0.26	ND	0.26	ND	0.26	ND	0.26	ND	0.26	ND	0.26	ND	0.26	ND	0.26
4-Chlorophenyl phenyl ether		ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49
Bis(2-chloroisopropyl)ether	300	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53
Bis(2-chloroethoxy)methane		ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
Hexachlorocyclopentadiene	40	ND	0.69	ND	0.69	ND	0.69	ND	0.69	ND	0.69	ND	0.69	ND	0.69	ND	0.69	ND	0.69	ND	0.69	ND	0.69
Hexachloroethane	7	ND	0.58	ND	0.58	ND	0.58	ND	0.58	ND	0.58	ND	0.58	ND	0.58	ND	0.58	ND	0.58	ND	0.58	ND	0.58
Isophorone	40	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2
Naphthalene	300	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46
Nitrobenzene	6	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77
NDPA/DPA	10	ND	0.42	ND	0.42	ND	0.42	ND	0.42	ND	0.42	ND	0.42	ND	0.42	ND	0.42	ND	0.42	ND	0.42	ND	0.42
n-Nitrosodi-n-propylamine		ND	0.64	ND	0.64	ND	0.64	ND	0.64	ND	0.64	ND	0.64	ND	0.64	ND	0.64	ND	0.64	ND	0.64	ND	0.64
Bis(2-ethylhexyl)phthalate	3	**5**	**1.5**	ND	1.5	ND	1.5	ND	1.5	2.1 J	1.5	ND	1.5	1.5 J	1.5	ND	1.5	ND	1.5	ND	1.5	ND	1.5
Butyl benzyl phthalate	100	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2	ND	1.2
Di-n-butylphthalate	700	ND	0.39	ND	0.39	ND	0.39	ND	0.39	ND	0.39	ND	0.39	ND	0.39	ND	0.39	ND	0.39	ND	0.39	ND	0.39
Di-n-octylphthalate	100	ND	1.3	ND	1.3	ND	1.3	ND	1.3	ND	1.3	ND	1.3	ND	1.3	ND	1.3	ND	1.3	ND	1.3	ND	1.3
Diethyl phthalate	6000	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38
Dimethyl phthalate		ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8
Chrysene	5	ND	0.34	ND	0.34	ND	0.34	ND	0.34	ND	0.34	ND	0.34	ND	0.34	ND	0.34	ND	0.34	ND	0.34	ND	0.34
Acenaphthylene		ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46
Anthracene	2000	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33
Benzo(ghi)perylene		ND	0.3	ND	0.3	ND	0.3	ND	0.3	ND	0.3	ND	0.3	ND	0.3	ND	0.3	ND	0.3	ND	0.3	ND	0.3
Fluorene	300	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41
Phenanthrene		ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33	ND	0.33
Pyrene	200	ND	0.28	ND	0.28	ND	0.28	ND	0.28	ND	0.28	ND	0.28	ND	0.28	ND	0.28	ND	0.28	ND	0.28	ND	0.28
4-Chloroaniline	30	ND	1.1	ND	1.1	ND	1.1	ND	1.1	ND	1.1	ND	1.1	ND	1.1	ND	1.1	ND	1.1	ND	1.1	ND	1.1
2-Nitroaniline		ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
3-Nitroaniline		ND	0.81	ND	0.81	ND	0.81	ND	0.81	ND	0.81	ND	0.81	ND	0.81	ND	0.81	ND	0.81	ND	0.81	ND	0.81
4-Nitroaniline		ND	0.8	ND	0.8	ND	0.8	ND	0.8	ND	0.8	ND	0.8	ND	0.8	ND	0.8	ND	0.8	ND	0.8	ND	0.8
Dibenzofuran		ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
2-Methylnaphthalene	30	ND	0.45	ND	0.45	ND	0.45	ND	0.45	ND	0.45	ND	0.45	ND	0.45	ND	0.45	ND	0.45	ND	0.45	ND	0.45
2,4,6-Trichlorophenol	20	ND	0.61	ND	0.61	ND	0.61	ND	0.61	ND	0.61	ND	0.61	ND	0.61	ND	0.61	ND	0.61	ND	0.61	ND	0.61
p-Chloro-m-cresol		ND	0.35	ND	0.35	ND	0.35	ND	0.35	ND	0.35	ND	0.35	ND	0.35	ND	0.35	ND	0.35	ND	0.35	ND	0.35
2-Chlorophenol	40	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48	ND	0.48
2,4-Dichlorophenol	20	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41	ND	0.41
2,4-Dimethylphenol	100	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8	ND	1.8
2-Nitrophenol		ND	0.85	ND	0.85	ND	0.85	ND	0.85	ND	0.85	ND	0.85	ND	0.85	ND	0.85	ND	0.85	ND	0.85	ND	0.85
4-Nitrophenol		ND	0.67	ND	0.67	ND	0.67	ND	0.67	ND	0.67	ND	0.67	ND	0.67	ND	0.67	ND	0.67	ND	0.67	ND	0.67
2,4-Dinitrophenol	40	ND	6.6	ND	6.6	ND	6.6	ND	6.6	ND	6.6	ND	6.6	ND	6.6	ND	6.6	ND	6.6	ND	6.6	ND	6.6
Phenol	2000	ND	0.57	ND	0.57	ND	0.57	ND	0.57	ND	0.57	ND	0.57	ND	0.57	ND	0.57	ND	0.57	ND	0.57	ND	0.57
2-Methylphenol	50	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49
2,4,5-Trichlorophenol	700	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77	ND	0.77
Carbazole		ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49	ND	0.49
4-Bromophenyl phenyl ether		ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38	ND	0.38
3,3'-Dichlorobenzidine	30	ND	1.6	ND	1.6	ND	1.6	ND	1.6	ND	1.6	ND	1.6	ND	1.6	ND	1.6	ND	1.6	ND	1.6	ND	1.6

Table 7
Hess Corporation Former Port Reading Complex
750 Cliff Road, Port Reading NJ
AOC 12 - Detention Basin/Smith Creek
Groundwater Analytical Results

Client Sample ID:	NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	SM-1		PER-2DD		PER-2		PER-2D		PER-3		PER-3D		PER-9		PER-9D		PER-9DD		PER-10		PER-10D	
Lab Sample ID:		L2168383-04		L2166615-05		L2166615-07		L2166615-06		L2167782-04		L2167782-03		L2168151-03		L2168151-02		L2168151-01		L2166200-10		L2166200-11	
Date Sampled:		12/13/2021		12/3/2021		12/3/2021		12/3/2021		12/9/2021		12/9/2021		12/10/2021		12/10/2021		12/10/2021		12/2/2021		12/2/2021	
Matrix:		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER	
Benzaldehyde		ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53
Acetophenone	700	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53	ND	0.53
Caprolactam	4000	ND	3.3	ND	3.3	ND	3.3	ND	3.3	ND	3.3	ND	3.3	ND	3.3	ND	3.3	ND	3.3	ND	3.3	ND	3.3
Biphenyl	400	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46	ND	0.46
1,2,4,5-Tetrachlorobenzene		ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44	ND	0.44
Atrazine	3	ND	0.76	ND	0.76	ND	0.76	ND	0.76	ND	0.76	ND	0.76	ND	0.76	ND	0.76	ND	0.76	ND	0.76	ND	0.76
2,3,4,6-Tetrachlorophenol	200	ND	0.84	ND	0.84	ND	0.84	ND	0.84	ND	0.84	ND	0.84	ND	0.84	ND	0.84	ND	0.84	ND	0.84	ND	0.84
SEMIVOLATILE ORGANICS BY GC/MS-SIM																							
4,6-Dinitro-o-cresol		ND	0.09	ND	0.09	ND	0.09	ND	0.09	ND	0.09	ND	0.09	ND	0.09	ND	0.09	ND	0.09	ND	0.09	ND	0.09
Benzo(a)anthracene	0.1	**0.11**	**0.02**	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	0.04 J	0.02	ND	0.02	ND	0.02	0.04 J	0.02	ND	0.02
Benzo(a)pyrene	0.1	**0.12**	**0.02**	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02
Benzo(b)fluoranthene	0.2	**0.31**	**0.01**	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	0.02 J	0.01	ND	0.01	ND	0.01	0.02 J	0.01	ND	0.01
Benzo(k)fluoranthene	0.5	0.08 J	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	0.02 J	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01
Dibenzo(a,h)anthracene	0.3	0.04 J	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	0.02 J	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01
Indeno(1,2,3-cd)pyrene	0.2	0.17	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	0.02 J	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01
Hexachlorobenzene	0.02	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01
Pentachlorophenol	0.3	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01
Hexachlorobutadiene	1	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05
1,4-Dioxane	0.4	ND	0.0326	**0.558**	**0.0303**	ND	0.0314	**1.25**	**0.0303**	0.104 J	0.0326	**2**	**0.0326**	ND	0.0326	**1.5**	**0.0314**	ND	0.0303	ND	0.0314	**14.2**	**0.0314**
SEMIVOLATILE ORGANICS BY GC/MS-TIC																							
Total TIC Compounds		112 J	0	8.32 J	0	68.2 J	0	-	-	122 J	0	210 J	0	26.5 J	0	112 J	0	34.8 J	0	43.4 J	0	400 J	0
TOTAL METALS																							
Aluminum, Total	200	**2230**	**3.27**	**520**	**3.27**	103	3.27	25.5	3.27	46.5	3.27	**208**	**3.27**	147	3.27	**793**	**3.27**	**977**	**3.27**	24	3.27	9.45 J	3.27
Antimony, Total	6	ND	0.429	ND	0.429	ND	0.429	ND	0.429	ND	0.429	ND	0.429	ND	0.429	ND	0.429	0.4522 J	0.429	ND	0.429	ND	0.429
Arsenic, Total	3	**9.05**	**0.165**	1.159	0.165	0.5774	0.165	0.1856 J	0.165	1.732	0.165	0.3074 J	0.165	1.026	0.165	1.72	0.165	0.3319 J	0.165	0.6336	0.165	0.1766 J	0.165
Barium, Total	6000	92.32	0.173	183.7	0.173	23.24	0.173	176.7	0.173	56.26	0.173	16.3	0.173	18.69	0.173	40.29	0.173	49.85	0.173	65.19	0.173	29.76	0.173
Beryllium, Total	1	0.116 J	0.107	0.2284 J	0.107	ND	0.107	0.1386 J	0.107	ND	0.107	ND	0.107	ND	0.107	ND	0.107	**1.004**	**0.107**	ND	0.107	ND	0.107
Cadmium, Total	4	0.2802	0.0599	ND	0.0599	ND	0.0599	ND	0.0599	ND	0.0599	ND	0.0599	ND	0.0599	ND	0.0599	ND	0.0599	ND	0.0599	ND	0.0599
Calcium, Total		18400	39.4	54000	39.4	27100	39.4	115000	39.4	41100	39.4	64200	39.4	19800	39.4	134000	39.4	115000	39.4	81300	39.4	57400	39.4
Chromium, Total	70	5.594	0.178	2.761	0.178	1.633	0.178	1.732	0.178	1.156	0.178	1.87	0.178	0.4473 J	0.178	3.113	0.178	5.176	0.178	0.5201 J	0.178	1.599	0.178
Cobalt, Total	100	3.54	0.163	0.7763	0.163	0.5128	0.163	0.2766 J	0.163	0.2561 J	0.163	0.4122 J	0.163	0.2155 J	0.163	1.985	0.163	1.521	0.163	ND	0.163	0.2495 J	0.163
Copper, Total	1300	20.44	0.384	13.39	0.384	6.005	0.384	20.3	0.384	ND	0.384	ND	0.384	1.786	0.384	4.461	0.384	3.764	0.384	1.445	0.384	29.55	0.384
Iron, Total	300	**12000**	**19.1**	**11800**	**19.1**	**6030**	**19.1**	**397**	**19.1**	**10000**	**19.1**	**390**	**19.1**	**2120**	**19.1**	**3360**	**19.1**	**96900**	**19.1**	**719**	**19.1**	76.8	19.1
Lead, Total	5	**13.48**	**0.343**	0.8106 J	0.343	0.5798 J	0.343	ND	0.343	0.409 J	0.343	ND	0.343	0.3521 J	0.343	1.911	0.343	1.559	0.343	ND	0.343	ND	0.343
Magnesium, Total		13900	24.2	10200	24.2	3910	24.2	26000	24.2	54200	24.2	168000	24.2	9020	24.2	48700	24.2	31800	24.2	15300	24.2	156000	24.2
Manganese, Total	50	**252.8**	**0.44**	**284.8**	**0.44**	**810.4**	**0.44**	**96.68**	**0.44**	**1381**	**0.44**	**177**	**0.44**	**194**	**0.44**	**102.8**	**0.44**	**2065**	**0.44**	**190.7**	**0.44**	**473.1**	**0.44**
Mercury, Total	2	ND	0.0915	ND	0.0915	ND	0.0915	ND	0.0915	ND	0.0915	ND	0.0915	ND	0.0915	ND	0.0915	ND	0.0915	0.167 J	0.0915	ND	0.0915
Nickel, Total	100	12.26	0.556	2.3	0.556	4.228	0.556	3.207	0.556	ND	0.556	ND	0.556	1.004 J	0.556	3.246	0.556	3.265	0.556	0.6573 J	0.556	3.151	0.556
Potassium, Total		9160	30.9	2560	30.9	2540	30.9	1460	30.9	25400	30.9	75700	30.9	4100	30.9	14600	30.9	9090	30.9	2520	30.9	69500	30.9
Selenium, Total	40	ND	1.73	ND	1.73	ND	1.73	ND	1.73	ND	1.73	ND	1.73	ND	1.73	ND	1.73	ND	1.73	ND	1.73	ND	1.73
Silver, Total	40	ND	0.163	ND	0.163	ND	0.163	ND	0.163	ND	0.163	ND	0.163	ND	0.163	ND	0.163	ND	0.163	ND	0.163	ND	0.163
Sodium, Total	50000	**101000**	**29.3**	27900	29.3	9300	29.3	**82000**	**29.3**	**509000**	**293**	**1290000**	**586**	**59900**	**29.3**	**298000**	**29.3**	**484000**	**29.3**	41200	29.3	**1300000**	**293**
Thallium, Total	2	ND	0.143	ND	0.143	ND	0.143	0.3815 J	0.143	ND	0.143	ND	0.143	ND	0.143	0.1914 J	0.143	0.3961 J	0.143	ND	0.143	ND	0.143
Vanadium, Total		8.341	1.57	3.28 J	1.57	ND	1.57	ND	1.57	1.865 J	1.57	4.174 J	1.57	ND	1.57	5.302	1.57	4.874 J	1.57	ND	1.57	2.64 J	1.57
Zinc, Total	2000	58.58	3.41	22.97	3.41	10.72	3.41	12.29	3.41	ND	3.41	ND	3.41	ND	3.41	10.08	3.41	32.29	3.41	21	3.41	4.82 J	3.41
GENERAL CHEMISTRY																							
Nitrogen, Ammonia	3000	878	120	94.4	24	593	24	230	24	**3280**	**24**	**12900**	**48**	377	24	**3020**	**24**	185	48	374	24	**18400**	**240**

Table 8
Hess Corporation Former Port Reading Complex
750 Cliff Road, Port Reading NJ
2021 SRMU - Groundwater Analytical Results

Client Sample ID:	NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	PL-1RR			PL-2			PL-3R			PL-4RR			PL-6RR			PL-8R				PL-9R			TM-5			TM-6R			TM-7		
Lab Sample ID:		L2166200-01			L2166200-04			L2166200-02			L2166615-09			L2167389-01			L2168383-02				L2166200-03			L2166615-01			L2168151-07			L2168151-06		
Date Sampled:		12/2/2021			12/2/2021			12/2/2021			12/3/2021			12/8/2021			12/13/2021				12/2/2021			12/3/2021			12/10/2021			12/10/2021		
Matrix:		WATER			WATER			WATER			WATER			WATER			WATER				WATER			WATER			WATER			WATER		
ANALYTE	(ug/l)	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	RL	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
VOLATILE ORGANICS BY GC/MS																																
1,2-Dibromo-3-chloropropane	0.02	ND		0.35	ND		0.35	ND		0.35	ND		0.35	ND		0.35	ND		2.5	0.35	ND		0.35	ND		0.35	ND		0.35	ND		0.35
1,2-Dibromoethane	0.03	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		2	0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19
Methylene chloride	3	ND		0.68	ND		0.68	ND		0.68	ND		0.68	ND		0.68	ND		2.5	0.68	ND		0.68	ND		0.68	ND		0.68	ND		0.68
1,1-Dichloroethane	50	ND		0.21	ND		0.21	ND		0.21	ND		0.21	ND		0.21	ND		0.75	0.21	ND		0.21	ND		0.21	ND		0.21	ND		0.21
Chloroform	70	ND		0.22	ND		0.22	ND		0.22	ND		0.22	ND		0.22	ND		0.75	0.22	ND		0.22	ND		0.22	ND		0.22	ND		0.22
Carbon tetrachloride	1	ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.5	0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13
1,2-Dichloropropane	1	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		1	0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14
Dibromochloromethane	1	ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.5	0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15
1,1,2-Trichloroethane	3	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.75	0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14
Tetrachloroethene	1	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.5	0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18
Chlorobenzene	50	24		0.18	2.5		0.18	1.3		0.18	ND		0.18	ND		0.18	ND		0.5	0.18	ND		0.18	ND		0.18	ND		0.18	1.3		0.18
Trichlorofluoromethane	2000	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		2.5	0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
1,2-Dichloroethane	2	ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.5	0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13
1,1,1-Trichloroethane	30	ND		0.16	0.42	J	0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.5	0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
Bromodichloromethane	1	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.5	0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19
trans-1,3-Dichloropropene		ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.5	0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
cis-1,3-Dichloropropene		ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.5	0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14
1,3-Dichloropropene, Total	1	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.5	0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14
Bromoform	4	ND		0.25	ND		0.25	ND		0.25	ND		0.25	ND		0.25	ND		2	0.25	ND		0.25	ND		0.25	ND		0.25	ND		0.25
1,1,2,2-Tetrachloroethane	1	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.5	0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17
Benzene	1	**2.5**		**0.08**	0.32	J	0.08	0.51		0.08	ND		0.08	0.22	J	0.08	ND		0.5	0.08	ND		0.08	ND		0.08	**18**		**0.08**	0.2	J	0.08
Toluene	600	ND		0.2	ND		0.2	0.35	J	0.2	ND		0.2	ND		0.2	ND		0.75	0.2	ND		0.2	ND		0.2	0.7	J	0.2	ND		0.2
Ethylbenzene	700	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.5	0.17	ND		0.17	ND		0.17	0.62		0.17	0.23	J	0.17
Chloromethane		ND		0.2	ND		0.2	ND		0.2	ND		0.2	ND		0.2	ND		2.5	0.2	ND		0.2	ND		0.2	ND		0.2	ND		0.2
Bromomethane	10	ND		0.26	ND		0.26	0.28	J	0.26	ND		0.26	ND		0.26	0.28	J	1	0.26	ND		0.26	ND		0.26	ND		0.26	ND		0.26
Vinyl chloride	1	ND		0.07	ND		0.07	ND		0.07	ND		0.07	ND		0.07	ND		0.2	0.07	ND		0.07	ND		0.07	ND		0.07	ND		0.07
Chloroethane		ND		0.13	ND		0.13	ND		0.13	ND		0.13	0.26	J	0.13	ND		1	0.13	ND		0.13	ND		0.13	ND		0.13	ND		0.13
1,1-Dichloroethene	1	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.5	0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17
trans-1,2-Dichloroethene	100	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.75	0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
Trichloroethene	1	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.5	0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18
1,2-Dichlorobenzene	600	0.32	J	0.18	0.27	J	0.18	ND		0.18	ND		0.18	ND		0.18	ND		2.5	0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18
1,3-Dichlorobenzene	600	0.96	J	0.19	0.39	J	0.19	ND		0.19	ND		0.19	ND		0.19	ND		2.5	0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19
1,4-Dichlorobenzene	75	2.3	J	0.19	0.86	J	0.19	ND		0.19	ND		0.19	ND		0.19	ND		2.5	0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19
Methyl tert butyl ether	70	0.18	J	0.17	2.1		0.17	4.2		0.17	ND		0.17	1.5		0.17	ND		1	0.17	ND		0.17	0.69	J	0.17	0.42	J	0.17	35		0.17
p/m-Xylene		ND		0.33	ND		0.33	1.6		0.33	ND		0.33	ND		0.33	ND		1	0.33	ND		0.33	ND		0.33	ND		0.33	ND		0.33
o-Xylene		ND		0.39	0.95	J	0.39	0.51	J	0.39	ND		0.39	ND		0.39	ND		1	0.39	ND		0.39	ND		0.39	ND		0.39	ND		0.39
Xylenes, Total	1000	ND		0.33	0.95	J	0.33	2.1	J	0.33	ND		0.33	ND		0.33	ND		1	0.33	ND		0.33	ND		0.33	ND		0.33	ND		0.33
cis-1,2-Dichloroethene	70	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.5	0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19
1,2-Dichloroethene, Total		ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.5	0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
Styrene	100	ND		0.36	ND		0.36	ND		0.36	ND		0.36	ND		0.36	ND		1	0.36	ND		0.36	ND		0.36	ND		0.36	ND		0.36
Dichlorodifluoromethane	1000	ND		0.24	ND		0.24	ND		0.24	ND		0.24	ND		0.24	ND		5	0.24	ND		0.24	ND		0.24	ND		0.24	ND		0.24
Acetone	6000	4	J	1.5	ND		1.5	2.4	J	1.5	ND		1.5	ND		1.5	ND		5	1.5	1.5	J	1.5	ND		1.5	ND		1.5	6.2		1.5
Carbon disulfide	700	ND		0.3	ND		0.3	ND		0.3	ND		0.3	ND		0.3	ND		5	0.3	ND		0.3	ND		0.3	ND		0.3	ND		0.3
2-Butanone	300	ND		1.9	ND		1.9	ND		1.9	ND		1.9	ND		1.9	ND		5	1.9	ND		1.9	ND		1.9	ND		1.9	ND		1.9
4-Methyl-2-pentanone		ND		0.42	ND		0.42	ND		0.42	ND		0.42	ND		0.42	ND		5	0.42	ND		0.42	ND		0.42	ND		0.42	ND		0.42
2-Hexanone	40	ND		0.52	ND		0.52	ND		0.52	ND		0.52	ND		0.52	ND		5	0.52	ND		0.52	ND		0.52	ND		0.52	ND		0.52
Bromochloromethane		ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		2.5	0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15
Isopropylbenzene	700	1.1		0.19	1.4		0.19	1.3		0.19	ND		0.19	0.22	J	0.19	ND		0.5	0.19	ND		0.19	ND		0.19	39		0.19	17		0.19
1,2,3-Trichlorobenzene		ND		0.23	ND		0.23	ND		0.23	ND		0.23	ND		0.23	ND		2.5	0.23	ND		0.23	ND		0.23	ND		0.23	ND		0.23
1,2,4-Trichlorobenzene	9	ND		0.22	ND		0.22	ND		0.22	ND		0.22	ND		0.22	ND		2.5	0.22	ND		0.22	ND		0.22	ND		0.22	ND		0.22
Methyl Acetate	7000	ND		0.23	ND		0.23	ND		0.23	ND		0.23	ND		0.23	ND		2	0.23	ND		0.23	ND		0.23	ND		0.23	ND		0.23
Cyclohexane		0.65	J	0.27	8.8	J	0.27	2.8	J	0.27	ND		0.27	0.66	J	0.27	ND		10	0.27	ND		0.27	ND		0.27	2.9	J	0.27	11		0.27
Tert-Butyl Alcohol	100	24		1.4	9.1	J	1.4	68		1.4	ND		1.4	38		1.4	1.4	J	10	1.4	ND		1.4	ND		1.4	6.2	J	1.4	**300**		**1.4**
Methyl cyclohexane		1.1	J	0.4	5.3	J	0.4	ND		0.4	ND		0.4	0.44	J	0.4	ND		10	0.4	ND		0.4	ND		0.4	3.3	J	0.4	11		0.4

Table 8
Hess Corporation Former Port Reading Complex
750 Cliff Road, Port Reading NJ
SRMU - Groundwater Analytical Results

Client Sample ID:	NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	PL-1RR			PL-2			PL-3R			PL-4RR			PL-6RR			PL-8R			PL-9R			TM-5			TM-6R			TM-7		
Lab Sample ID:		L2166200-01			L2166200-04			L2166200-02			L2166615-09			L2167389-01			L2168383-02			L2166200-03			L2166615-01			L2168151-07			L2168151-06		
Date Sampled:		12/2/2021			12/2/2021			12/2/2021			12/3/2021			12/8/2021			12/13/2021			12/2/2021			12/3/2021			12/10/2021			12/10/2021		
Matrix:		WATER			WATER			WATER			WATER			WATER			WATER			WATER			WATER			WATER			WATER		
Freon-113	20000	ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND	2.5	0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15
VOLATILE ORGANICS BY GC/MS-TIC																															
Total TIC Compounds		35	J	0	83.3	J	0	23.5	J	0	-	-	-	25.5	J	0	-	-	-	-		-	-		-	362	J	0	191	J	0
SEMIVOLATILE ORGANICS BY GC/MS																															
Acenaphthene	400	1.3	J	0.44	2.1		0.44	ND		0.44	ND		0.44	0.46	J	0.44	ND	2	0.44	ND		0.44	ND		0.44	0.72	J	0.44	0.92	J	0.44
3-Methylphenol/4-Methylphenol	50	ND		0.48	ND		0.48	ND		0.48	ND		0.48	ND		0.48	ND	5	0.48	ND		0.48	ND		0.48	ND		0.48	ND		0.48
Bis(2-chloroethyl)ether	7	ND		0.5	ND		0.5	ND		0.5	ND		0.5	ND		0.5	ND	2	0.5	ND		0.5	ND		0.5	ND		0.5	ND		0.5
2-Chloronaphthalene	600	ND		0.44	ND		0.44	ND		0.44	ND		0.44	ND		0.44	ND	2	0.44	ND		0.44	ND		0.44	ND		0.44	ND		0.44
2,4-Dinitrotoluene	10	ND		1.2	ND		1.2	ND		1.2	ND		1.2	ND		1.2	ND	5	1.2	ND		1.2	ND		1.2	ND		1.2	ND		1.2
2,6-Dinitrotoluene	10	ND		0.93	ND		0.93	ND		0.93	ND		0.93	ND		0.93	ND	5	0.93	ND		0.93	ND		0.93	ND		0.93	ND		0.93
Fluoranthene	300	ND		0.26	ND		0.26	ND		0.26	ND		0.26	ND		0.26	ND	2	0.26	ND		0.26	ND		0.26	ND		0.26	ND		0.26
4-Chlorophenyl phenyl ether		ND		0.49	ND		0.49	ND		0.49	ND		0.49	ND		0.49	ND	2	0.49	ND		0.49	ND		0.49	ND		0.49	ND		0.49
Bis(2-chloroisopropyl)ether	300	ND		0.53	ND		0.53	ND		0.53	ND		0.53	ND		0.53	ND	2	0.53	ND		0.53	ND		0.53	ND		0.53	ND		0.53
Bis(2-chloroethoxy)methane		ND		0.5	ND		0.5	ND		0.5	ND		0.5	ND		0.5	ND	5	0.5	ND		0.5	ND		0.5	ND		0.5	ND		0.5
Hexachlorocyclopentadiene	40	ND		0.69	ND		0.69	ND		0.69	ND		0.69	ND		0.69	ND	20	0.69	ND		0.69	ND		0.69	ND		0.69	ND		0.69
Hexachloroethane	7	ND		0.58	ND		0.58	ND		0.58	ND		0.58	ND		0.58	ND	2	0.58	ND		0.58	ND		0.58	ND		0.58	ND		0.58
Isophorone	40	ND		1.2	ND		1.2	ND		1.2	ND		1.2	ND		1.2	ND	5	1.2	ND		1.2	ND		1.2	ND		1.2	ND		1.2
Naphthalene	300	ND		0.46	0.61	J	0.46	ND		0.46	ND		0.46	ND		0.46	ND	2	0.46	ND		0.46	ND		0.46	ND		0.46	0.7	J	0.46
Nitrobenzene	6	ND		0.77	ND		0.77	ND		0.77	ND		0.77	ND		0.77	ND	2	0.77	ND		0.77	ND		0.77	ND		0.77	ND		0.77
NDPA/DPA	10	ND		0.42	ND		0.42	ND		0.42	ND		0.42	ND		0.42	ND	2	0.42	ND		0.42	ND		0.42	ND		0.42	ND		0.42
n-Nitrosodi-n-propylamine		ND		0.64	ND		0.64	ND		0.64	ND		0.64	ND		0.64	ND	5	0.64	ND		0.64	ND		0.64	ND		0.64	ND		0.64
Bis(2-ethylhexyl)phthalate	3	1.6	J	1.5	1.6	J	1.5	ND		1.5	ND		1.5	ND		1.5	ND	3	1.5	ND		1.5	ND		1.5	1.8	J	1.5	1.9	J	1.5
Butyl benzyl phthalate	100	ND		1.2	ND		1.2	ND		1.2	ND		1.2	ND		1.2	ND	5	1.2	ND		1.2	ND		1.2	ND		1.2	ND		1.2
Di-n-butylphthalate	700	ND		0.39	ND		0.39	ND		0.39	ND		0.39	ND		0.39	ND	5	0.39	ND		0.39	ND		0.39	ND		0.39	ND		0.39
Di-n-octylphthalate	100	ND		1.3	ND		1.3	ND		1.3	ND		1.3	ND		1.3	ND	5	1.3	ND		1.3	ND		1.3	ND		1.3	ND		1.3
Diethyl phthalate	6000	ND		0.38	ND		0.38	ND		0.38	ND		0.38	ND		0.38	ND	5	0.38	ND		0.38	ND		0.38	ND		0.38	ND		0.38
Dimethyl phthalate		ND		1.8	ND		1.8	ND		1.8	ND		1.8	ND		1.8	ND	5	1.8	ND		1.8	ND		1.8	ND		1.8	ND		1.8
Chrysene	5	ND		0.34	ND		0.34	ND		0.34	ND		0.34	ND		0.34	ND	2	0.34	ND		0.34	ND		0.34	ND		0.34	ND		0.34
Acenaphthylene		ND		0.46	ND		0.46	ND		0.46	ND		0.46	ND		0.46	ND	2	0.46	ND		0.46	ND		0.46	ND		0.46	ND		0.46
Anthracene	2000	ND		0.33	0.34	J	0.33	ND		0.33	ND		0.33	ND		0.33	ND	2	0.33	ND		0.33	ND		0.33	ND		0.33	ND		0.33
Benzo(ghi)perylene		ND		0.3	ND		0.3	ND		0.3	ND		0.3	ND		0.3	ND	2	0.3	ND		0.3	ND		0.3	ND		0.3	ND		0.3
Fluorene	300	1.9	J	0.41	3.1		0.41	ND		0.41	ND		0.41	ND		0.41	ND	2	0.41	ND		0.41	ND		0.41	0.75	J	0.41	1.5	J	0.41
Phenanthrene		0.72	J	0.33	0.72	J	0.33	ND		0.33	ND		0.33	ND		0.33	ND	2	0.33	ND		0.33	ND		0.33	ND		0.33	0.36	J	0.33
Pyrene	200	0.31	J	0.28	0.4	J	0.28	ND		0.28	ND		0.28	ND		0.28	ND	2	0.28	ND		0.28	ND		0.28	ND		0.28	ND		0.28
4-Chloroaniline	30	ND		1.1	ND		1.1	ND		1.1	ND		1.1	ND		1.1	ND	5	1.1	ND		1.1	ND		1.1	ND		1.1	ND		1.1
2-Nitroaniline		ND		0.5	ND		0.5	ND		0.5	ND		0.5	ND		0.5	ND	5	0.5	ND		0.5	ND		0.5	ND		0.5	ND		0.5
3-Nitroaniline		ND		0.81	ND		0.81	ND		0.81	ND		0.81	ND		0.81	ND	5	0.81	ND		0.81	ND		0.81	ND		0.81	ND		0.81
4-Nitroaniline		ND		0.8	ND		0.8	ND		0.8	ND		0.8	ND		0.8	ND	5	0.8	ND		0.8	ND		0.8	ND		0.8	ND		0.8
Dibenzofuran		0.57	J	0.5	0.53	J	0.5	ND		0.5	ND		0.5	ND		0.5	ND	2	0.5	ND		0.5	ND		0.5	ND		0.5	0.59	J	0.5
2-Methylnaphthalene	30	ND		0.45	2.6		0.45	ND		0.45	ND		0.45	ND		0.45	ND	2	0.45	ND		0.45	ND		0.45	ND		0.45	1.4	J	0.45
2,4,6-Trichlorophenol	20	ND		0.61	ND		0.61	ND		0.61	ND		0.61	ND		0.61	ND	5	0.61	ND		0.61	ND		0.61	ND		0.61	ND		0.61
p-Chloro-m-cresol		ND		0.35	ND		0.35	ND		0.35	ND		0.35	ND		0.35	ND	2	0.35	ND		0.35	ND		0.35	ND		0.35	ND		0.35
2-Chlorophenol	40	ND		0.48	ND		0.48	ND		0.48	ND		0.48	ND		0.48	ND	2	0.48	ND		0.48	ND		0.48	ND		0.48	ND		0.48
2,4-Dichlorophenol	20	ND		0.41	ND		0.41	ND		0.41	ND		0.41	ND		0.41	ND	5	0.41	ND		0.41	ND		0.41	ND		0.41	ND		0.41
2,4-Dimethylphenol	100	ND		1.8	ND		1.8	ND		1.8	ND		1.8	ND		1.8	ND	5	1.8	ND		1.8	ND		1.8	ND		1.8	ND		1.8
2-Nitrophenol		ND		0.85	ND		0.85	ND		0.85	ND		0.85	ND		0.85	ND	10	0.85	ND		0.85	ND		0.85	ND		0.85	ND		0.85
4-Nitrophenol		ND		0.67	ND		0.67	ND		0.67	ND		0.67	ND		0.67	ND	10	0.67	ND		0.67	ND		0.67	ND		0.67	ND		0.67
2,4-Dinitrophenol	40	ND		6.6	ND		6.6	ND		6.6	ND		6.6	ND		6.6	ND	20	6.6	ND		6.6	ND		6.6	ND		6.6	ND		6.6
Phenol	2000	ND		0.57	ND		0.57	ND		0.57	ND		0.57	ND		0.57	ND	5	0.57	ND		0.57	ND		0.57	ND		0.57	ND		0.57
2-Methylphenol	50	ND		0.49	ND		0.49	ND		0.49	ND		0.49	ND		0.49	ND	5	0.49	ND		0.49	ND		0.49	ND		0.49	ND		0.49
2,4,5-Trichlorophenol	700	ND		0.77	ND		0.77	ND		0.77	ND		0.77	ND		0.77	ND	5	0.77	ND		0.77	ND		0.77	ND		0.77	ND		0.77
Carbazole		ND		0.49	ND		0.49	ND		0.49	ND		0.49	ND		0.49	ND	2	0.49	ND		0.49	ND		0.49	ND		0.49	ND		0.49
4-Bromophenyl phenyl ether		ND		0.38	ND		0.38	ND		0.38	ND		0.38	ND		0.38	ND	2	0.38	ND		0.38	ND		0.38	ND		0.38	ND		0.38
3,3'-Dichlorobenzidine	30	ND		1.6	ND		1.6	ND		1.6	ND		1.6	ND		1.6	ND	5	1.6	ND		1.6	ND		1.6	ND		1.6	ND		1.6

Table 8
Hess Corporation Former Port Reading Complex
750 Cliff Road, Port Reading NJ
SRMU - Groundwater Analytical Results

Client Sample ID:	NJ Groundwater Criteria (NJAC 7:9C 9/4/18)	PL-1RR			PL-2			PL-3R			PL-4RR			PL-6RR			PL-8R				PL-9R			TM-5			TM-6R			TM-7		
Lab Sample ID:		L2166200-01			L2166200-04			L2166200-02			L2166615-09			L2167389-01			L2168383-02				L2166200-03			L2166615-01			L2168151-07			L2168151-06		
Date Sampled:		12/2/2021			12/2/2021			12/2/2021			12/3/2021			12/8/2021			12/13/2021				12/2/2021			12/3/2021			12/10/2021			12/10/2021		
Matrix:		WATER			WATER			WATER			WATER			WATER			WATER				WATER			WATER			WATER			WATER		
Benzaldehyde		ND		0.53	ND		0.53	ND		0.53	ND		0.53	ND		0.53	ND		5	0.53	ND		0.53	ND		0.53	ND		0.53	ND		0.53
Acetophenone	700	ND		0.53	ND		0.53	ND		0.53	ND		0.53	ND		0.53	ND		5	0.53	ND		0.53	ND		0.53	ND		0.53	ND		0.53
Caprolactam	4000	ND		3.3	ND		3.3	ND		3.3	ND		3.3	ND		3.3	ND		10	3.3	ND		3.3	ND		3.3	ND		3.3	ND		3.3
Biphenyl	400	ND		0.46	ND		0.46	ND		0.46	ND		0.46	ND		0.46	ND		2	0.46	ND		0.46	ND		0.46	ND		0.46	ND		0.46
1,2,4,5-Tetrachlorobenzene		ND		0.44	ND		0.44	ND		0.44	ND		0.44	ND		0.44	ND		10	0.44	ND		0.44	ND		0.44	ND		0.44	ND		0.44
Atrazine	3	ND		0.76	ND		0.76	ND		0.76	ND		0.76	ND		0.76	ND		3	0.76	ND		0.76	ND		0.76	ND		0.76	ND		0.76
2,3,4,6-Tetrachlorophenol	200	ND		0.84	ND		0.84	ND		0.84	ND		0.84	ND		0.84	ND		5	0.84	ND		0.84	ND		0.84	ND		0.84	ND		0.84
SEMIVOLATILE ORGANICS BY GC/MS-SIM																																
4,6-Dinitro-o-cresol		ND		0.09	ND		0.09	ND		0.09	ND		0.09	ND		0.09	ND		0.7	0.09	ND		0.09	ND		0.09	ND		0.09	ND		0.09
Benzo(a)anthracene	0.1	0.06	J	0.02	**0.12**		**0.02**	0.05	J	0.02	ND		0.02	0.04	J	0.02	0.05	J	0.1	0.02	0.03	J	0.02	ND		0.02	0.02	J	0.02	ND		0.02
Benzo(a)pyrene	0.1	0.03	J	0.02	0.06	J	0.02	0.04	J	0.02	ND		0.02	0.02	J	0.02	ND		0.1	0.02	ND		0.02	ND		0.02	ND		0.02	ND		0.02
Benzo(b)fluoranthene	0.2	0.03	J	0.01	0.07	J	0.01	0.1		0.01	ND		0.01	0.02	J	0.01	0.03	J	0.1	0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.01
Benzo(k)fluoranthene	0.5	0.01	J	0.01	0.02	J	0.01	0.03	J	0.01	ND		0.01	ND		0.01	0.01	J	0.1	0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.01
Dibenzo(a,h)anthracene	0.3	ND		0.01	ND		0.01	0.02	J	0.01	ND		0.01	ND		0.01	ND		0.1	0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.01
Indeno(1,2,3-cd)pyrene	0.2	0.02	J	0.01	0.03	J	0.01	0.09	J	0.01	ND		0.01	ND		0.01	0.02	J	0.1	0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.01
Hexachlorobenzene	0.02	ND		0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.02	0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.01
Pentachlorophenol	0.3	ND		0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.3	0.01	ND		0.01	ND		0.01	ND		0.01	ND		0.01
Hexachlorobutadiene	1	ND		0.05	ND		0.05	ND		0.05	ND		0.05	ND		0.05	ND		1	0.05	ND		0.05	ND		0.05	ND		0.05	ND		0.05
1,4-Dioxane	0.4	0.126	J	0.0326	0.156		0.0314	**2.42**		**0.0339**	0.13	J	0.0326	**0.477**		**0.0326**	ND		0.144	0.0326	0.0628	J	0.0326	0.205		0.0326	ND		0.0314	0.396		0.0314
SEMIVOLATILE ORGANICS BY GC/MS-TIC																																
Total TIC Compounds		83.6	J	0	108	J	0	118	J	0	13.4	J	0	56.5	J	0	70	J	0	0	13.1	J	0	26.2	J	0	224	J	0	240	J	0
TOTAL METALS																																
Aluminum, Total	200	10.8		3.27	**318**		**3.27**	16.8		3.27	104		3.27	**489**		**3.27**	171		10	3.27	18.1		3.27	57.8		3.27	22.9		3.27	6.06	J	3.27
Antimony, Total	6	0.8109	J	0.429	ND		0.429	ND		0.429	1.908	J	0.429	0.6505	J	0.429	ND		4	0.429	ND		0.429	ND		0.429	ND		0.429	ND		0.429
Arsenic, Total	3	**3.289**		**0.165**	**4.949**		**0.165**	2.396		0.165	**7.698**		**0.165**	**5.695**		**0.165**	**3.613**		**0.5**	**0.165**	1.666		0.165	0.8375		0.165	2.008		0.165	**8.241**		**0.165**
Barium, Total	6000	116.5		0.173	24.47		0.173	110.3		0.173	11.03		0.173	111		0.173	26.41		0.5	0.173	34.02		0.173	7.535		0.173	93.51		0.173	68.31		0.173
Beryllium, Total	1	ND		0.107	ND		0.107	ND		0.107	ND		0.107	ND		0.107	ND		0.5	0.107	ND		0.107	ND		0.107	ND		0.107	ND		0.107
Cadmium, Total	4	0.0884	J	0.0599	ND		0.0599	ND		0.0599	ND		0.0599	ND		0.0599	ND		0.2	0.0599	ND		0.0599	ND		0.0599	ND		0.0599	ND		0.0599
Calcium, Total		71000		39.4	4490		39.4	35300		39.4	25900		39.4	40400		39.4	57300		100	39.4	53600		39.4	8520		39.4	39300		39.4	61400		39.4
Chromium, Total	70	0.9953	J	0.178	2.848		0.178	1.511		0.178	3.002		0.178	2.731		0.178	3.075		1	0.178	0.4497	J	0.178	0.7975	J	0.178	2.271		0.178	1.68		0.178
Cobalt, Total	100	0.2905	J	0.163	0.2534	J	0.163	0.3724	J	0.163	0.1712	J	0.163	0.7511		0.163	0.3761	J	0.5	0.163	0.3116	J	0.163	0.2595	J	0.163	0.22	J	0.163	2.226		0.163
Copper, Total	1300	2.991		0.384	2.759		0.384	2.825		0.384	5.185		0.384	5.924		0.384	5.381		1	0.384	0.9962	J	0.384	2.696		0.384	0.9679	J	0.384	1.33		0.384
Iron, Total	300	**6610**		**19.1**	**19200**		**19.1**	**9760**		**19.1**	269		19.1	**25300**		**19.1**	**1930**		**50**	**19.1**	**5820**		**19.1**	99.6		19.1	**31300**		**19.1**	**11600**		**19.1**
Lead, Total	5	0.3965	J	0.343	0.9656	J	0.343	ND		0.343	0.9694	J	0.343	2.092		0.343	2.753		1	0.343	0.4011	J	0.343	0.4976	J	0.343	0.6428	J	0.343	ND		0.343
Magnesium, Total		21000		24.2	7050		24.2	84900		24.2	5290		24.2	33400		24.2	6630		70	24.2	12600		24.2	6480		24.2	7600		24.2	20300		24.2
Manganese, Total	50	**468.9**		**0.44**	22.34		0.44	**123.8**		**0.44**	22.39		0.44	**581.2**		**0.44**	**52.98**		**1**	**0.44**	**323**		**0.44**	**319.4**		**0.44**	**1194**		**0.44**	**5623**		**0.44**
Mercury, Total	2	ND		0.0915	ND		0.0915	ND		0.0915	ND		0.0915	ND		0.0915	ND		0.2	0.0915	ND		0.0915	ND		0.0915	ND		0.0915	ND		0.0915
Nickel, Total	100	1.544	J	0.556	ND		0.556	1.357	J	0.556	1.058	J	0.556	1.596	J	0.556	2.471		2	0.556	1.558	J	0.556	2.531		0.556	1.863	J	0.556	3.838		0.556
Potassium, Total		8790		30.9	8300		30.9	34000		30.9	6820		30.9	22800		30.9	5160		100	30.9	1620		30.9	1950		30.9	8430		30.9	633		30.9
Selenium, Total	40	ND		1.73	ND		1.73	ND		1.73	ND		1.73	ND		1.73	ND		5	1.73	ND		1.73	ND		1.73	ND		1.73	ND		1.73
Silver, Total	40	ND		0.163	ND		0.163	ND		0.163	ND		0.163	ND		0.163	ND		0.4	0.163	ND		0.163	ND		0.163	ND		0.163	ND		0.163
Sodium, Total	50000	**158000**		**29.3**	**261000**		**29.3**	**1200000**		**293**	**78100**		**29.3**	**486000**		**29.3**	23700		100	29.3	42600		29.3	**279000**		**29.3**	29500		29.3	**105000**		**29.3**
Thallium, Total	2	ND		0.143	ND		0.143	ND		0.143	ND		0.143	0.386	J	0.143	ND		1	0.143	0.179	J	0.143	ND		0.143	ND		0.143	ND		0.143
Vanadium, Total		2.471	J	1.57	3.827	J	1.57	ND		1.57	7.703		1.57	2.96	J	1.57	ND		5	1.57	ND		1.57	ND		1.57	ND		1.57	ND		1.57
Zinc, Total	2000	4.463	J	3.41	7.575	J	3.41	4.134	J	3.41	18.27		3.41	14.19		3.41	15.65		10	3.41	5.008	J	3.41	24.15		3.41	24.93		3.41	15.99		3.41
GENERAL CHEMISTRY																																
Nitrogen, Ammonia	3000	989		24	**3720**		**48**	**9120**		**24**	201		24	**5100**		**24**	168		75	24	237		24	240		24	**3420**		**24**	179		24

APPENDIX A

SOIL BORING LOG
Boring Name: SLF-SBGRD-12
Permit No: NA

EnviroTrac Environmental Services

Client: Hess	Site Name: Port Reading Refinery	Latitude: 40°33'42.89"
Site Address: 750 Cliff Road, Port Reading, New Jersey		Longitude: 74°14'49.96
Drilling Company: Summit Drilling		Sonic Drilling
Start Date: 9/6/2013	Complete Date: 9/9/2013	Soil Logger/Company: SD/ET
Boring Diameter: 4"	Completion Depth: 30.0'	Depth to Water: 3.5'

Soil Boring Lithology	Depth (feet)	Samples ID	Samples Depth	PID	SOIL DESCRIPTION
	0				
					0.0'-0.25' ROADSTONE
	1				0.25'-3.0' ROADSTONE and tight brown CLAY
	2				
	3				
					3.0'-4.0' Grayish brown CLAY and Sand, some rounded Gravel
	4				
					4.0'-5.0' Brownish gray SAND, some Clay and Gravel
	5				
				23.7	5.0'-7.5' Black stone and Sand (Fill Material)
	6				
	7				
					7.5'-8.0' Stone and light brown CLAY, trace Sand
	8				8.0'-9.0' Brown and black Sandy SILT (heavey staining)
	9				
					9.0'-10.0'- Black and grey fine SAND with Clay (stained)
	10				
				235.0	10.0'-10.5'- Organic Material (wood)
	11			122.0	10.5'-11.5'- Brownish grey SAND, some brown and black Clay
				58.1	
	12	SBGRD-12	(11.5'-12.0')		11.5'-12.5'- Grey Silt, some brown and black SAND
	13				12.5'-16.0'- Grey Silt and CLAY
	14			7.9	
				8.0	
	15			6.0	
				6.9	
	16				
	17			5.8	
				6.1	17.0'-27.5' Organic grey CLAY
	18			5.0	
				6.4	
	19			5.9	
				5.2	
	20	SBGRD-12	(19.5'-20.0')	4.3	
				4.8	
	21				
				4.1	
	22				
				4.8	
	23				
				4.2	
	24				
				4.6	
	25				
				5.1	
	26			3.7	
				4.2	
	27				
				5.8	
	28				27.5'-28.5' Organic grey Clay, trace of medium Sand
				4.3	
	29				28.5'-30.0'- Grey medium to fine SAND
		SBGRD-12	(29.0'-29.5')	4.3	
	30				
				4.1	

* Background atmospheric reading ranged from 0.2 to 5.2 for duration of boring installation

SOIL BORING LOG

Boring Name: SLF-SBGRD-13

Permit No: NA

Client: Hess	Site Name: Port Reading Refinery	Latitude: 40°33'43.57"
Site Address: 750 Cliff Road, Port Reading, New Jersey		Longitude: 74°14'46.96
Drilling Company: Summit Drilling		Method: Sonic Drilling
Start Date: 9/6/2013	Complete Date: 9/9/2013	Soil Logger/Company: SD/ET
Boring Diameter: 4"	Completion Depth: 30.0'	Depth to Water: NA

Soil Boring Lithology	Depth (feet)	Samples ID	Samples Depth	PID	SOIL DESCRIPTION
	0				
					0.0'-0.25' ROADSTONE
					0.25'-3.0' ROADSTONE and tight brown CLAY
	1				
	2				
	3				
					3.0'-6.0' Brown Sand and CLAY, some Gravel
	4				
				15.8	
	5				
				8.1	
	6				
					6.0'-7.0' No Recovery
	7				
				0.0	7.0'-9.5' Light yellowish tan Sandy CLAY
				0.0	
	8				
				0.0	
				0.0	
	9				
				0.0	
				7.8	9.5'-12.0' Brown and gray Sandy CLAY, some fill material
	10				
				170.0	
				81.0	
	11				
				138.0	
				282.0	
	12				
				383.0	12.0'-13.0' Organic grey CLAY (PEAT)
				98.0	12.5-13.0 Heavy staining
	13				
		SBGRD-13	(13.0'-13.5')	38.0	13.0-15.0 Organic grey Clay, some Silt
				20.8	
	14				
				19.1	
				15.2	
	15				
				17.1	15.0'-20.0' No Recovery
	16				
	17				
	18				
	19				
	20				
				3.6	20.0'-27.5' Organic grey CLAY, with trace of PEAT and
				0.0	Shell fragments
	21				
				4.2	
				7.8	
	22				
				5.2	
				5.8	
	23				
				2.8	
				3.2	
	24				
				1.1	
		SBGRD-13	(24.5'-25.0')	7.8	
	25				
				1.2	
				4.6	
	26				
				3.5	
				4.2	
	27				
				6.8	
				0.0	27.5'-28.0' PEAT and organic grey Clay
	28				
				0.0	28.0'-30.0' Grey Sandy CLAY
				0.0	
	29				
		SBGRD-13	(29.0'-29.5')	0.0	
				0.0	
	30				

* Background atmospheric reading ranged from 1.8 to 7.8 for duration of boring installation

APPENDIX B

QUALITY ASSURANCE PROJECT PLAN

AOC 13 – Former Oily Water Lagoons
AOC 42 – Methanol Truck Unloading Area, Decontamination Area
AOC 87 – Flare Knock Out Drum
Hess Corporation – Former Port Reading Complex (HC-PR)
750 Cliff Road
Port Reading, Middlesex County, New Jersey
NJDEP PI# 006148
ISRA Case No. E20130449
EPA ID No. NJD045445483

PREPARED FOR:

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AUGUST 2022

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Table of Contents

INTRODUCTION

This Quality Assurance Project Plan (QAPP) was prepared by Earth Systems, Inc. (Earth Systems) for Hess Corporation, who is conducting remedial investigation (RI) activities at an environmental area of concern designated as AOC 13: Former Oily Water Lagoons, AOC 42: Methanol Truck Unloading Area, Decontamination Area, and AOC 87: Flare Knock Out Drum located at 750 Cliff Road, Port Reading (Woodbridge Township), Middlesex County, New Jersey (Property or site).

The purpose of this QAPP is to ensure that scientific data are acquired according to established methods and procedures designed to obtain results that are objective, true, repeatable, and of known accuracy. Specifically, this QAPP provides guidance and specifications to ensure that RI activities are planned and executed in a manner consistent with the Quality Assurance Objectives (QAO's) stated below:

- Field determinations and analytical results are valid through adherence to New Jersey Department of Environmental Protection (NJDEP) field procedures, NJDEP-approved analytical protocols, and calibration and preventive maintenance of equipment;
- Samples are identified and controlled through sample tracking systems and chain of custody procedures;
- Records are retained as documentary evidence of field activities and observations;
- Samples are collected and analytical data are validated in accordance with the NJDEP requirements; and
- Evaluations of the data are accurate, appropriate, and consistent throughout the project.

The contents of this QAPP are based on the NJDEP requirements as stated in the NJDEP Technical Requirements for Site Remediation and the Quality Assurance Project Plan Technical Guidance (Version 1.0, April 2014). This QAPP includes the following components:

- Problem Definition/Background;
- Project/Task Description;
- Project/Task Organization;
- Data Quality Objectives and Criteria for Measurement Data;
- Historical and Secondary Information/Data;
- Investigative Process Design;
- Field Instrumentation/Equipment Calibration and Frequency;
- Inspection/Acceptance of Supplies and Consumables;
- Sample Handling and Custody Requirements;
- Field Storage and Transport Procedures;
- Sample Containers, Preservation, and Holding Times;
- Analytical Methods Summary Table;
- Project Compounds and Analytical Summary;
- Analytical Quality Control;
- Laboratory Deliverables;
- Data and Records Management;
- Data Verification and Usability; and
- Corrective Action Processes.

As specific conditions and additional information warrant, this QAPP will be amended or revised to include site-specific quality assurance/quality control procedures.

Quality Assurance Project Plan
AOC 13, 42, and 87
Hess Corporation – Former Port Reading Complex
750 Cliff Road
Port Reading, Middlesex County, New Jersey

1. Project Definition / Background

Project Definition

The property is owned by Hess Corporation and is located at 750 Cliff Road, Port Reading, New Jersey. AOC 13, 42, and 87 are currently (and historically) located in the southwestern portion of HC-PR. AOC 13: Former Oily Water Lagoon used to be comprised of three lagoons (Former Oily Water Lagoon, Mini-Lagoon, and Filter Backwash Lagoon). AOC 42: Methanol Truck Unloading Area, Decontamination Area is located east of AOC 14b (Rundown Tankfield), and AOC 87: Flare Knock Out Drum was located southeast of AOC 14b. Currently, there are thirty-one (31) groundwater monitoring wells surrounding AOC 13, 42, and 87 utilized to monitor impacts in the shallow, intermediate, and deep groundwater zones for several Volatile Organic Compounds (VOCs) and Semi-Volatile Organic Compounds (SVOCs). Light Non-Aqueous Phase Liquid (LNAPL) was originally detected in one of these monitoring wells in the 1998. LNAPL recovery has been conducted at these monitoring wells utilizing various methods, including vacuum recovery, from impacted monitoring wells. During the most recent groundwater gauging events, LNAPL was not detected in any of the monitoring wells associated with AOC 13, 42, and 87.

The overall project goals and objectives are summarized below:

- Soil Investigation;
- Groundwater Investigation.

The analytical data shall be used to determine if further soil and groundwater investigation is required. These decisions shall be made following receipt of all analytical data associated with the investigation. Data users for the project include the person responsible for conducting the remediation, the environmental consultant, and ultimately, the NJDEP.

2. Project / Task Description

A series of permanent monitoring wells is provided below:

Well ID	Well Depth
OL-1	15 ft
OL-1D	35 ft
OL-2	15 ft
OL-3	15 ft
OL-4	15 ft
OL-5	15 ft
OL-5D	35 ft
OL-6	15 ft

OL-6D	35 ft
OL-7	15 ft
OL-8	15 ft
OL-9	15 ft
OL-10	15 ft

During the installation of the permanent monitoring wells, soil borings will be collected. Each soil boring will be completed using a hand auger/air knife equipment to 6 to 8 feet below grade. Once a depth of 6 to 8 feet is achieved, a Geoprobe will be used to install the soil borings to the proposed final depth.

Soil borings will be field screened with a calibrated photoionization detector (PID) and lithology will be logged in a dedicated field book. One (1) soil sample will be collected for approximately every 6 feet of the soil column, biased toward any indication of impacts. The soil analysis for each soil boring are summarized in **Table 1**. The location of the proposed monitoring well locations are illustrated on the attached **Figure 2a**

The sample results shall be compared to the applicable remediation standards and a conclusion shall be made, based on the comparison, as to whether the Area of Concern (AOC) requires further investigation / action or no further investigation / action is required.

The applicable regulatory quality standards to this phase of investigation are:

- o NJDEP Residential and Non-Residential Soil Remediation Standards (SRS)
- o NJDEP Default Impact to Groundwater Soil Screening Levels (IGWSSL)
- o NJDEP Ground Water Quality Standards (GWQS)

3. Project / Task Organization

The NJDEP's "Quality Assurance Project Plan Technical Guidance" recommends that the QAPP include an organizational chart identifying key personnel and/or organizations showing relationships and lines of communication. As stated in Section 5 of the guidance, not all elements of the QAPP may need the same level of detail, which should be based on a graded approach depending on the complexity of the project and the intended use of the data. In this regard, since the number of personnel and organizations is relatively small, the relationships can be described rather than depicted in a chart.

Project Team

The Licensed Site Remediation Professional (LSRP) is John Virgie of Earth Systems. He also serves as the central point of communication with all other individuals and organizations associated with this project. He is responsible for implementing the Quality Assurance Project Plan and coordinating the site investigation activities. He can be reached at (732) 739-6444.

The Senior Project Manager is Ms. Amy Blake of Earth Systems. She is responsible for coordinating the site investigation activities in the field and tabulating/interpreting the analytical data once received. She can be reached at (732) 739-6444.

The Health and Safety Officer and Project Manager for Earth Systems is Mr. Michael Piegaro. He can be reached at (732) 739- 6444.

Laboratory: Alpha Analytical: 8 Walkup Drive, Westborough, Massachusetts 08810 (Contact: Ms. Cynthia Romero @ cromero@alphalabs.com).

Drilling Contractor: Uni-Tech Drilling Company, 49 Old York Road, Bridgewater, New Jersey 08807 (Contact: Greg Adams @ 908-725-7500)

Special Training Needs/Certification

Training needs and certifications of field oversight include requirements to have completed the OSHA 40-Hour training with annual 8-hour refresher training in accordance with 29 CFR 1910.120 (Hazardous waste operations and emergency response). In addition, site workers must have a TWIC card and at least one person on-site must have completed Buckeye Person-In-Charge (PIC) training.

The site investigation activities are being conducted under the oversight of an LSRP.

Special training is required to operate laboratory equipment and conduct laboratory analyses. Laboratory certification is established at N.J.A.C. 7:18.

4. Data Quality Objectives and Criteria for Measurement Data

Data quality objectives ("DQOs") are qualitative and quantitative statements that are developed in the first six (6) steps of the DQO process. DQOs define the purpose of the data collection effort, clarify what the data should represent to satisfy this purpose, and specify the performance requirements for the quality of information to be obtained from the data.

In accordance with Section 5.4 of the NJDEP's "Quality Assurance Project Plan" technical guidance, the development of the data quality criteria can be developed through the formal DQO process described in the EPA document titled "Guidance for the Data Quality Objectives Process", EPA/600/R-96/055. For most projects, however, a less iterative process is normally used to develop the project-specific DQOs.

Data of Known Quality Protocols ("DKQP") describe specific laboratory quality assurance and quality control procedures which, if followed, will provide data of known and documented quality (i.e. scientific reproducible and reliable data). When data of known quality ("DKQ") is obtained, an evaluation of the data with respect to its intended purpose can be made. To this end, a NJDEP-certified laboratory must be used to analyze samples whenever possible.

Typical DQOs are often expressed in terms of data quality indicators ("DQIs") including precision, accuracy, representativeness, comparability, completeness and sensitivity (also known as the "PARCCS" parameters). These measures of performance are discussed in detail below.

<u>Precision</u>
Precision is the measure of agreement among repeated measurements of the same property under identical or substantially similar testing conditions. The investigator will determine the precision of the data by:

- Using the same analytical methods to perform repeated analyses on the same sample (laboratory or matrix duplicates);
- Collection of a field duplicate and submittal of both to evaluate the precision from sample collection, for sample handling, preservation and storage and analytical measurements

Precision for laboratory and field measurements can be expressed as the relative percent difference ("RPD") between two duplicate determinations or percent relative standard deviation ("%RSD") between multiple determinations.

Acceptance criteria for field precision shall be assessed through the splitting of a sample in the field and submitting both to the laboratory. Field duplicates will be collected at a frequency of one (1) per twenty (20) investigative samples per matrix per analytical parameter. Precision will be measured through the calculation of RPD. The resulting information will be used to assess sample homogeneity, spatial variability at the site, sample collection reproducibility, and analytical variability.

<u>Accuracy</u>
Accuracy is the degree of agreement of a measured value and an accepted reference or true value. The difference between the measured value and the reference or true value includes components of both systematic error (bias) and random error (precision). It should be noted that precise data may not be accurate

data. Accuracy can be expressed as a percent recovery or percent deviation of the measurement with respect to its known or true value.

The accuracy will be determined through establishing acceptance criteria for spike recoveries (e.g., surrogate recoveries, laboratory control sample recoveries, matrix spike recoveries, reference material recoveries etc.) or allowable deviations for calibration (e.g., %RPD for calibration verification). Acceptance criteria for matrix spike measurements are expressed as a percent recovery and are usually specified in the analytical method (or laboratory SOP, as applicable). Various blank samples (laboratory or field) may also be used to assess contamination of samples that may bias results high. Accuracy in the field shall be assessed through the adherence to sample collection, handling, preservation, and holding time requirements.

<u>Representativeness</u>
Representativeness is a qualitative measurement that describes the extent to which analytical data represent the site conditions. In almost every project, the investigator will not be able to measure the whole system, process, or situation of interest. Instead, the investigator will choose sample locations, quantities, and analyses in order to capture a sufficiently broad and/or weighted view of the situation.

Representativeness in the laboratory is ensured by using the proper analytical procedures, appropriate methods, and meeting sample holding times. Following the detailed requirements outlined in the EPA methods and the laboratory SOPs will maximize the representativeness of the laboratory data.

<u>Comparability</u>
Comparability is a qualitative term that expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Comparability is defined as the extent to which data from one data set can be compared directly to similar or related data sets and/or decision-making standards.

Historical data should be evaluated to determine whether they may be combined with data being collected in present time. Comparability should discuss comparisons of sample collection and handling methods, sample preparation, and analytical procedures, holding times, stability issues and QA protocol.

Comparability in the laboratory is dependent on the use of recognized methods and approved laboratory SOPs. Comparability in the field is dependent upon adherence to the sampling methodology and that the proper preservation techniques are used.

<u>Completeness</u>
Completeness is a measure of the amount of usable data collected compared to the amount of data expected to be obtained. Three measures of completeness are defined as:

- Sampling completeness, defined as the number of valid samples collected relative to the number of samples planned for collection;
- Analytical completeness, defined as the number of valid sample measurements relative to the number of valid samples collected; and
- Overall completeness, defined as the number of valid sample measurements relative to the number of samples planned for collection.

Sensitivity

Sensitivity refers to the ability of an analytical procedure to quantify an analyte at a given concentration. The sensitivity requirements should be established such that the laboratory method Reporting Limits ("RLs") are at or below the relevant and applicable regulatory limits for each Contaminant of Concern ("COC") for the project. For the purpose of SRP projects:

- The RL for a specific substance when determining the extent and degree of polluted soil, groundwater, or sediment from a release. For the purpose of this document, the RL is defined as:
  - Organics, the lowest initial calibration standard as adjusted for the dilution factor, sample weight/volume, and moisture content;
  - Inorganics, the concentration of that analyte in the lowest level check standard (which could be the lowest calibration standard in a multi-point calibration curve).

Methods for analysis have been chosen to meet the sensitivity requirements for a project (e.g., compound-specific and matrix-specific). If however, the laboratory RLs exceed the project sensitivity requirements (i.e., the RL is above the relevant and applicable regulatory standard), the analytical methods may need to be adjusted (e.g., analysis conducted using a more sensitive method or sample preparation and analysis features adjusted to gain sensitivity) and/or the project objectives may need to be adjusted (i.e., certain COCs may not be able to be screened out during this phase of the evaluation).

5. Historical and Secondary Information / Data

The potential sources of data for any project include both historical data (i.e. data not collected by the current investigator) and secondary data (i.e. data that were collected for a different purpose than that for which they are now being used). Historical data should be evaluated for applicability to current project objectives. Secondary data should be assessed to determine if the quality of the data is sufficient for the current project objectives and meets comparability criteria (it is not sufficient that the secondary data were produced by a reliable source or a known environmental monitoring project with an approved QAPP).

6. Investigation Process Design

A description and justification of the investigation design should include, for each area of interest:

- The COCs or other parameters of interest
- The number of anticipated investigation points and how and why they will be selected including a site map depicting proposed sample locations
- Method of obtaining/determining locational information (such as the use of GPS instrumentation)
- Factors which could affect the variability of the data such as physical obstructions, seasonal variations, tidal influences, soil profile changes, weather-related variation, and process variation within the source
- Design basis i.e. probability based or judgment based
- Results comparison (i.e. versus previous data, regulatory standards, reference population, etc.)
- Matrices to be monitored including any special sampling requirements
- Monitoring frequency (if applicable)
- Heterogeneity or homogeneity of the matrix
- Appropriateness of composite samples
- Required quality control samples

The investigative process design is based generally on the following:

- The Technical Requirements for Site Remediation N.J.A.C. 7:26E.
- The NJDEP's "Field Sampling Procedures Manual (FSPM)" dated August 2005.

7. Field Quality Control

Field equipment cleaning / decontamination are not expected to be required as all field equipment shall be dedicated to each individual sample. However, if decontamination is required, equipment will be cleaned using a detergent wash followed by a tap water rinse. The final step will be to rinse the equipment using distilled/deionized water.

8. Field Instrumentation / Equipment Calibration and Frequency

Field instrumentation/equipment that will require calibration includes a photoionization detector (PID) and water quality meter. Calibration and routine maintenance procedures are presented in the User's Manual. Documentation of the maintenance and calibration records is stored at the office or in the field logbook.

9. Inspection / Acceptance of Supplies and Consumables

Critical supplies or consumables (e.g., pre-cleaned containers, pre-preserved containers, tubing, etc.) shall be inspected for visible indications of contamination and damage and, if none are identified, then the supplies/consumables shall be accepted for use.

10. Sample Handling and Custody Requirements

Sample handling shall be as specified in Section 2.5.5.1 of the FSPM and Section 4.6.2.2 of the NJDEP's "Data Quality Assessment and Data Usability Evaluation Technical Guidance", Version 1.0, dated April 2014. Specifically, samples shall be maintained on-site for no more than two (2) consecutive days, and shall be delivered to the laboratory within one (1) day of shipment from the field.

The chain of custody procedure to be utilized in the field is specified in Section 2.3.6 of the FSPM. The chain of custody procedure to be used in the laboratory shall be in accordance with Section 2.3.6 of the FSPM as well as the laboratory's standard operating procedure.

11. Field Storage and Transport Procedures

Samples shall remain in direct site and in the custody of field personnel at all times until transfer to the laboratory.

12. Sample Containers, Preservation, and Holding Times

Sample containers, preservation, and holding times are specified on Table 1.

13. Analytical Methods Summary Table

Analytical methods are summarized on Table 1.

14. Project Compounds and Analytical Summary

Soil samples will be collected and analyzed for Target Compound List Volatile Organic Compounds plus Tentatively-Identifiable Compounds ((TCL VOC+15), Target Compound List Semi-Volatile Organic Compounds plus Tentatively-Identifiable Compounds (TCL BN+15), Target Analyte List Metals (TAL Metals) and Extractable Petroleum Hydrocarbons (EPH). Groundwater samples will be collected and analyzed for TCL VOC+15, TAL Metals, and TCL Base Neutrals plus TICs. The project action limits are the NJDEP's SRS, IGWSSL and GWQS. The analytical methods chosen can meet the DQOs of the project.

Analytical sensitivity requirements include the use of instruments or methods to detect the contaminants of concern at or below the action limits. The RLs are expected to be below the applicable regulatory standards. NJDEP and EPA methods were selected to achieve the action limits. Laboratories may need to adjust RLs based on dilutions, sample sizes, extract/digestate volumes, percent solids and cleanup procedures. Sensitivity will be maximized by following the NJDEP and EPA methods or laboratory SOPs utilizing experienced, trained laboratory personnel and by conducting laboratory audits.

15. Analytical Quality Control

Quality assurance and quality control ("QA/QC") requirements for analysis are specified in the most recent version of the document titled "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", prepared by EPA. The laboratory may also have QA/QC procedures in addition to those specified by the test method (Appendix 1).

16. Laboratory Deliverables

The laboratory deliverable format to be used for this project shall be the reduced laboratory deliverable format as described in Appendix A of N.J.A.C. 7:26E. The laboratory shall also generate Hazsite files and spreadsheets of the analytical results.

17. Data and Records Management

The recording media for the project will be both paper and electronic. The project will implement proper document control procedures for both, consistent with NJDEP's Quality Management Plan. For instance, hand-recorded data records will be taken with indelible ink, and changes to such data records will be made by drawing a single line through the error with an initial by the responsible person. The Project Manager will have ultimate responsibility for any and all changes to records and documents. Similar controls will be put in place for electronic records.

The Quality Assurance Coordinator shall retain all updated versions of the QAPP and be responsible for distribution of the current version of the QAPP. The Quality Assurance Coordinator and the Project Manager will approve periodic updates. The Project Manager shall retain copies of all management reports, memoranda, and all correspondence between the parties identified in Section 3.

Project data shall be stored in the Project Manager's office. Laboratory records management is described in Appendix 1.

18. Data Verification and Usability

The procedure for review (verification and usability procedures) including data assessment versus stated data quality objectives of the investigation is specified in the NJDEP's "Data Quality Assessment and Data Usability Evaluation Technical Guidance", Version 1.0, dated April 2014.

19. Corrective Action Processes

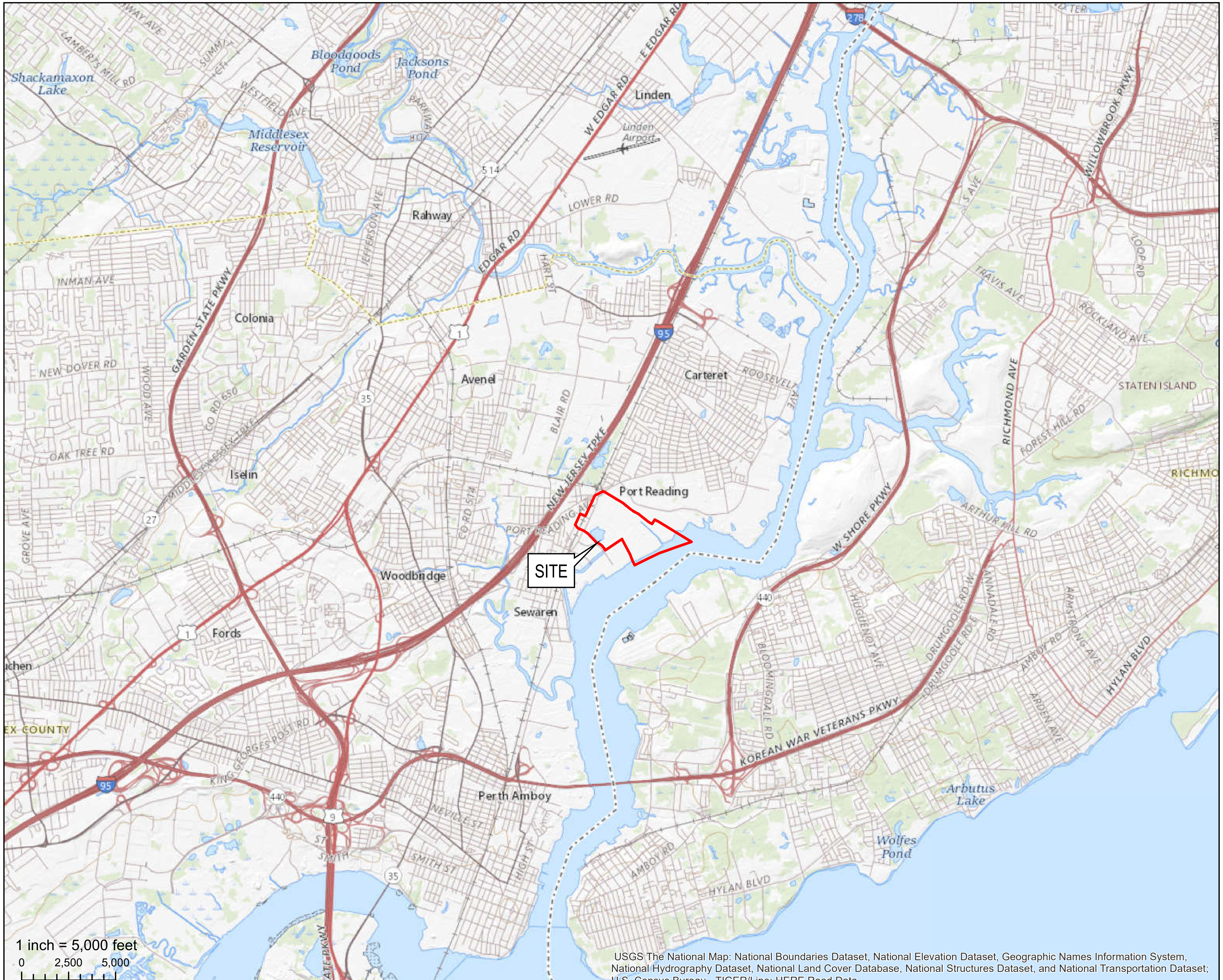
Corrective action in the field may be needed when the work plan is modified (i.e. number or locations of samples) or when sampling procedures and/or field analytical procedures require modification due to unexpected conditions. The corrective action may be implemented at the time the determination is made in the field or may be implemented later, depending on the circumstances. Any corrective actions taken shall be documented in the field logbook and in the technical report.

Corrective actions in the laboratory may be needed when Non-Conformances occur. The laboratory shall implement and document corrective actions in accordance with the laboratory SOP.

Table 1: Analytical Methods / Quality Assurance Summary Table

TABLE 1 Analytical Methods/Quality Assurance Summary Table AOC 10: Truck Loading Rack, Hess Corporation - Former Port Reading Complex, Port Reading, Middlesex County, New Jersey								
Matrix type	Number of Samples	Number of Blanks	Number of Duplicates	Analytical Parameters	Analytical Methods	Sample Preservati on	Sample Container & Volume	Permissible Holding Time
Soil	35	0	0	Extractable Petroleum Hydrocarbons	NJ EPH	<6ºC HC to pH<2	1x4 ounce clear	14 days
Soil	35	1	0	Volatile Organic Compounds	8260C	4ºC methanol	EnCore	14 days
Soil	35	0	0	Base Neutral Compounds	8270D	4ºC N/A	8 oz.	14 days
Soil	35	0	0	TAL Metals	6010	4ºC N/A	Clear glass, 4 ounce	14 days
Ground Water	13	2	0	Volatile Organic Compounds	8260	4ºC, HCl	Clear glass 40 mL	14 days
Ground water	13	2	0	TAL Metals, Ammonia	SW846/6010	HNO3 to pH<2	500-ml Amber	6 months
Ground water	13	2	0	Base Neutrals	8270	<6ºC	2 x 1000-ml Amber	7 days extraction/40 days holding time

Figure 1: Site Location Map



LEGEND

Port Reading Site Boundary

N

NEW JERSEY QUADRANGLE LOCATION:
53 - JERSEY CITY, NEW JERSEY

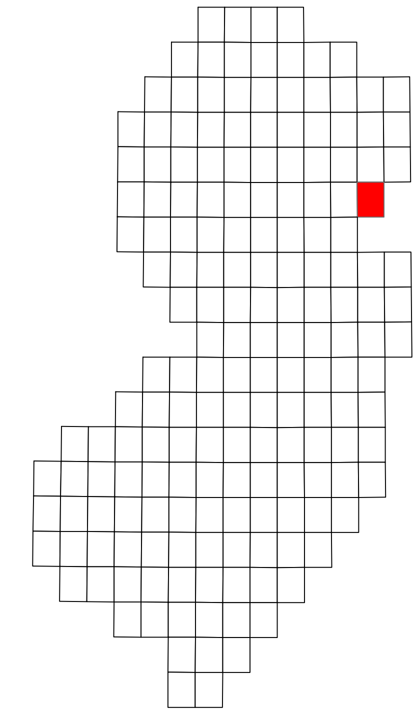


FIGURE 1:
USGS SITE LOCATION MAP

HESS CORPORATION
FORMER PORT READING TERMINAL
750 CLIFF ROAD
PORT READING, NEW JERSEY

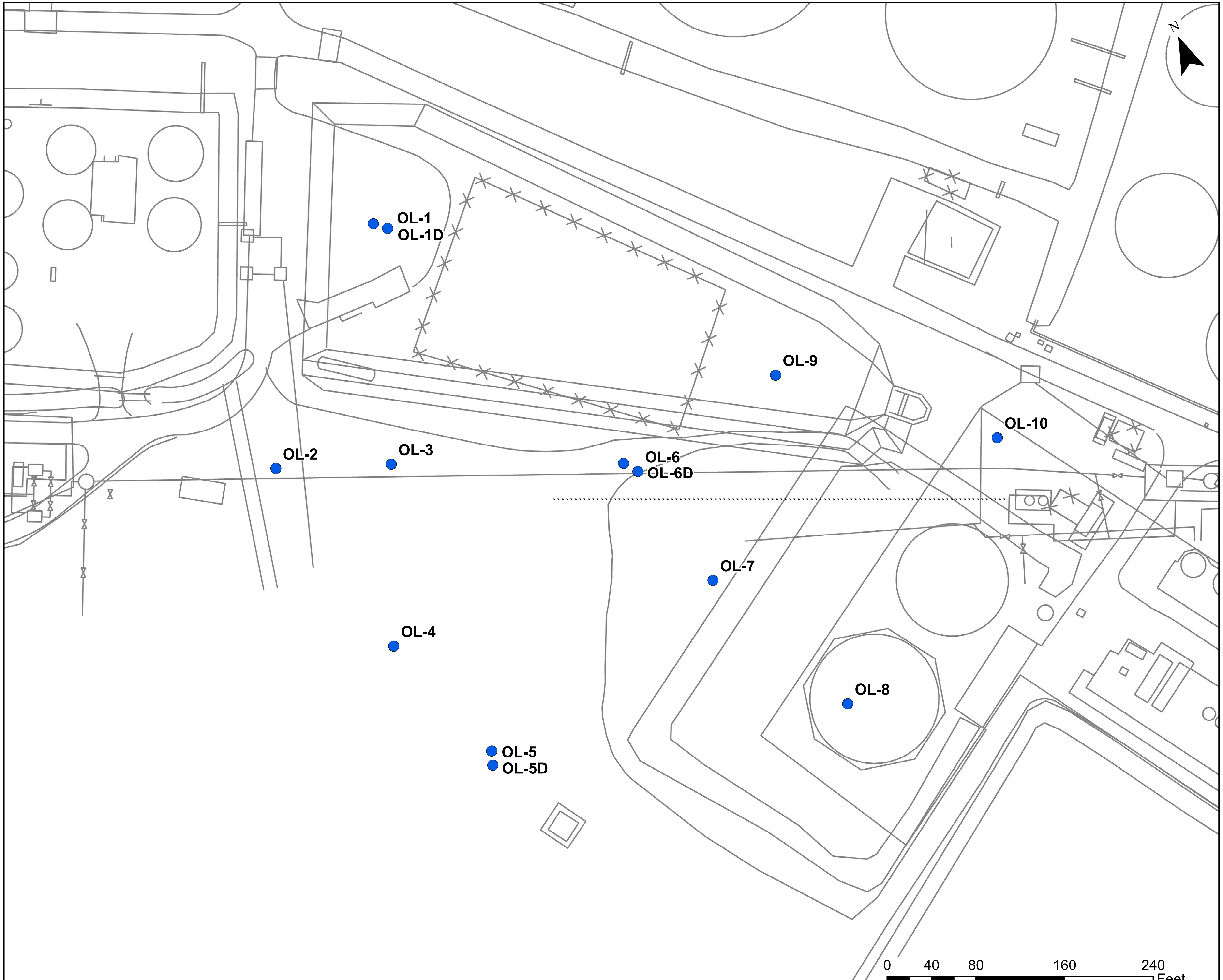
Project #:	1114J01	**Drawn:**	4/16/2020
SRP PI#:	006148	**Drawn By:**	RC

Earth Systems
Environmental Engineering
1625 Highway 71, Belmar, NJ 07719
T. 732.739.6444 | F. 732.739.0451

This map was developed using New Jersey Department of Environmental Protection Geographic Information System Digital Data, but this secondary product has not been verified by NJDEP and is not state Authorized. Source: NAD 1983 (2011) New Jersey State Plane FIPS 2900 US FT.

Document Path: P:\ArcGIS\HESS Projects\1114J00 - Port Reading Hess\1114J01 - Sitewide\GIS\Port Reading - USGS Site Location Figure.mxd

Figure 2: Location of Area of Concern



LEGEND

Proposed Monitoring Well Location

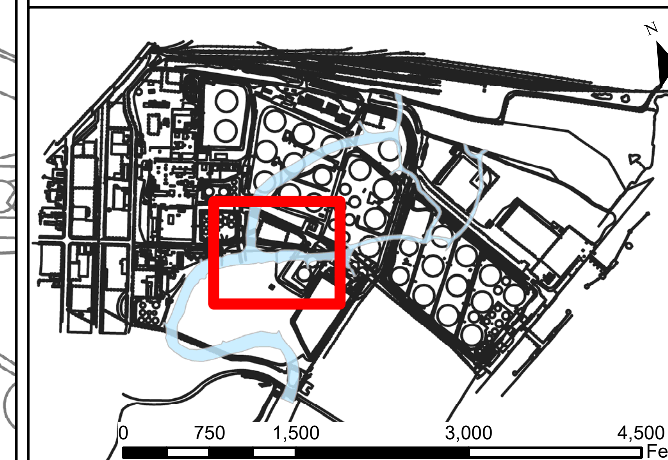


FIGURE: 2a

Proposed Monitoring Well Locations

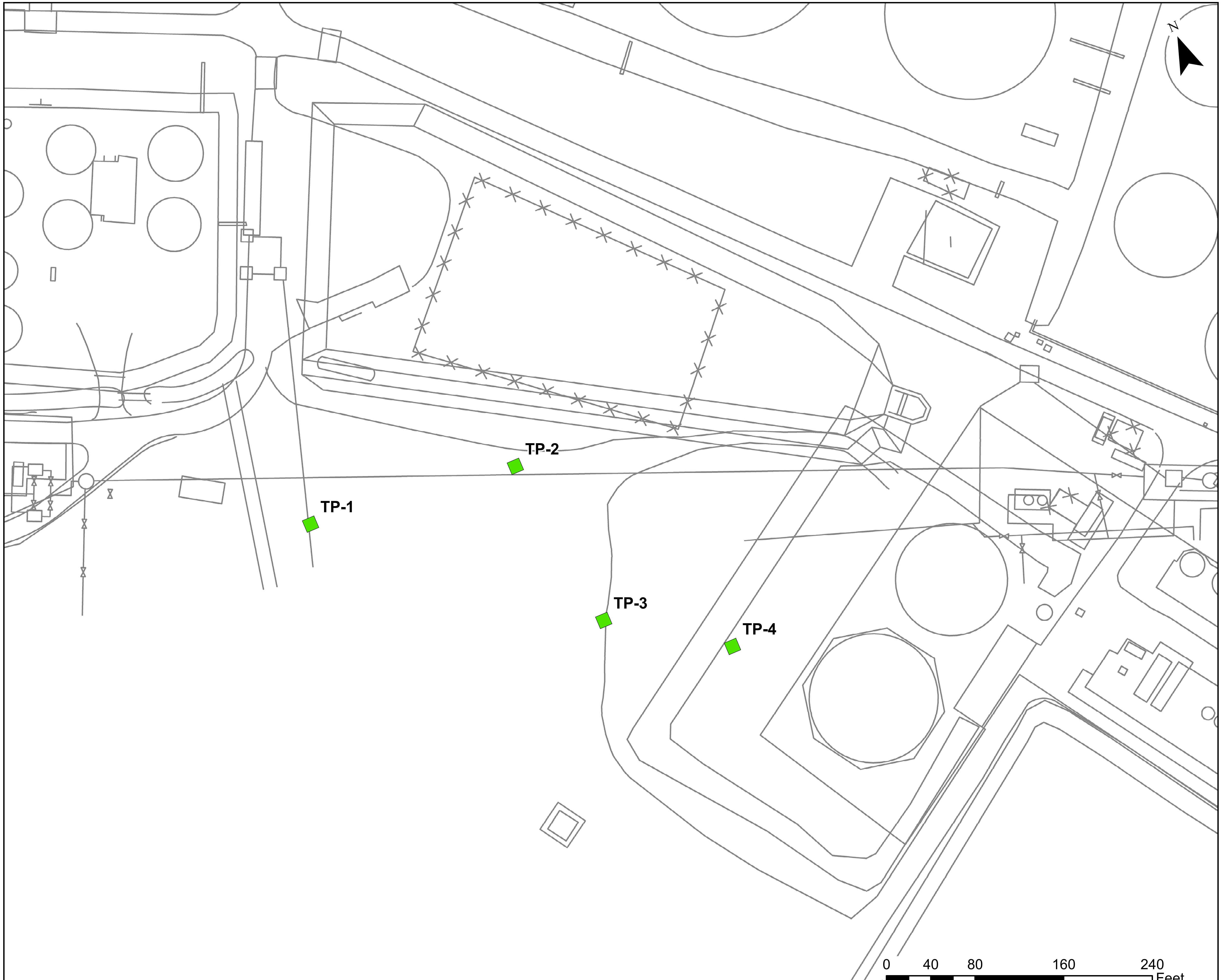
HESS CORPORATION
FORMER PORT READING TERMINAL
750 CLIFF ROAD
PORT READING, NEWJERSEY

Project #:	1114J01.22	**Date:**	08/04/2022
SRP PI#:	006148	**Drawn By:**	RC

Earth Systems
Environmental Engineering

1625 Highway 71, Belmar, NJ 07719
T. 732.739.6444

Document Path: A:\HESS Projects\1114J00 - Port Reading Hess\1114J01 - Sitewide\GIS_mxd\Oily Lagoon RIW\Oily Lagoon - Proposed Monitoring Well Map.mxd



LEGEND

Proposed Test Pit Location

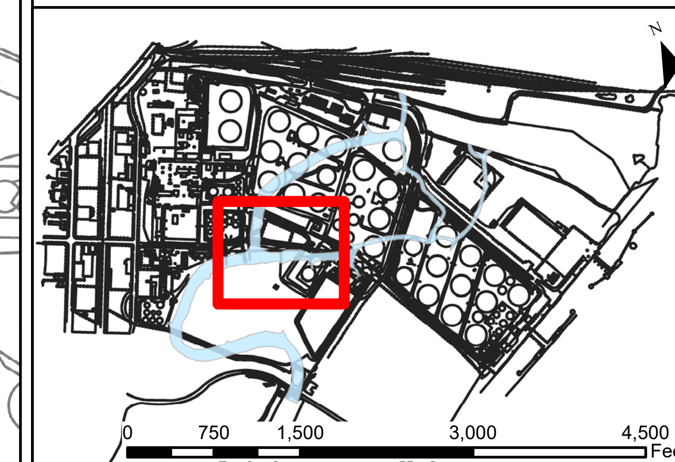


FIGURE: 2b

Proposed Test Pit Locations

HESS CORPORATION
FORMER PORT READING TERMINAL
750 CLIFF ROAD
PORT READING, NEWJERSEY

Project #:	1114J01.22	**Date:**	08/04/2022
SRP PI#:	006148	**Drawn By:**	RC

Earth Systems
Environmental Engineering

1625 Highway 71, Belmar, NJ 07719
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This map was developed using New Jersey Department of Environmental Protection Geographic Information System Digital Data, but this secondary product has not been verified by NJDEP and is not state authorized.
Source: NAD 1983 (2011) New Jersey State Plane FIPS 2900 US FT.

Document Path: A:\HESS Projects\1114J00 - Port Reading Hess\1114J01 - Sitewide\GIS_mxd\Oily Lagoon RIW\Oily Lagoon - Proposed Test Pit Location.mxd

Appendix 1: Laboratory Quality Systems Manual

Quality Systems Manual

Alpha Analytical, Inc.

D/B/A

Alpha Analytical
Eight Walkup Drive
Westborough, MA 01581-1019
Telephone: (508) 898-9220
Facsimile: (508) 898-9193

Alpha Analytical
Woods Hole Labs Facility
320 Forbes Blvd
Mansfield, MA 02048
Telephone: (508) 822-9300
Facsimile: (508) 822-3288

Email: info@alphalab.com
Web site: www.alphalab.com

Quality Assurance Officer: James Todaro, Ext 508-439-5101
Laboratory Technical Manager (Director) Westboro: Joseph Watkins 508-439-5125
Laboratory Technical Manager (Director) Mansfield: John Trimble, 508-844-4134
Laboratory Technical Manager (Director) Air-Mansfield: Andy Rezendes, 508-844-4181

Approvers:
Jim Todaro Approved on 12/3/2020 3:37:44 AM, Joe Watkins Approved on 10/23/2020 3:06:03 PM, John Trimble Approved on 8/25/2020 11:20:37 AM, Andrew Rezendes Approved on 8/17/2020 9:52:28 AM

1 Mission Statement

The mission of Alpha Analytical is quite simply to provide our customers with the greatest value in analytical service available. For the 'greatest value' is not only found in the data that is delivered, it is also found in the services provided.

- Data must be of the highest integrity, accuracy and precision.
- Consultation and educational services must be provided to support the customer in establishing data quality objectives and interpretation of the final data package.
- Support services such as sample containers, courier service and electronic data deliverables must be available to the customer.

Alpha's mission continues with an established commitment to our community and environment. We must ensure that we do not produce any additional contamination to our environment or harm our neighbors and community in any way.

The value of Alpha's product is in the honesty and integrity with which each chemist, courier, login staff member, or office staff member performs their tasks. The customer or employee must always feel satisfied that they received the greatest value in their lab experience at Alpha.

Alpha Analytical will vigorously pursue its mission into the next millennium.

Mark Woelfel

President

2 Table of Contents

Section Description....Page

3 Introduction

The Quality Systems Manual, referred to as Corporate Quality Systems Manual (CQSM) of Alpha Analytical describes the quality program in use at the laboratory for both Westboro and Mansfield facilities. This Quality Systems Manual provides employees, customers and accrediting agencies with the necessary information to become familiar with how the quality system operates within Alpha Analytical. The quality program includes quality assurance, quality control, and the laboratory systems including feedback mechanisms for the automated continuous improvement of the laboratory operations to meet customer needs.

Implementation of the laboratory operations is by documenting procedures, training personnel and reviewing operations for improvement. Written procedures are maintained as Standard Operating Procedures (SOPs). The SOPs are available to the staff as a controlled, electronic, secure copy. The provisions of the QSM are binding on all temporary and permanent personnel assigned responsibilities. All laboratory personnel must adhere strictly to the QSM and SOPs.

All policies and procedures have been structured in accordance with the NELAC Institute (TNI) Standards), DOD QSM 5.1 and applicable EPA requirements and standards.

Twenty-five (25) sections comprise the QSM. Related quality documentation including the listing of SOPs, forms, floor plan, equipment, personnel and laboratory qualifications are available. The QSM sections provide overview descriptions of objectives, policies, services and operations.

3.1 Scope

The QSM describes the requirements of the Laboratory to demonstrate competency in the operations for performing environmental tests for inorganic, organic, air and microbiological testing. The basis for the environmental tests is the methods found in documents published by the United States Environmental Protection Agency (EPA), ASTM, AOAC, APHA/AWWA/WEF, Standard Methods, and other procedures and techniques supplied by customers.

The QSM includes requirements and information for assessing competence and determining compliance by the laboratory to the quality system. When more stringent standards or requirements are included in a mandated test method, by regulation, or specified in a project plan the laboratory demonstrates achievement of the customer specified requirements through its documented processes.

The QSM is for use by Alpha Analytical for developing and implementing the quality system. Accrediting authorities and customers use the QSM for assessing the competence of Alpha Analytical. Alpha Analytical is committed to continually improving the quality system. Meeting customer needs, operating within regulatory requirements and adhering to Alpha's Data Integrity and Ethics policy are several of the mechanism used to continually improve the quality system.

3.2 Policy Statement

This Quality Systems Manual summarizes the policies, responsibilities and operational procedures associated with Alpha Analytical. This manual applies to all associates of the laboratory and is intended for use in the on-going operations at Alpha Analytical. Specific protocols for sample handling and storage, chain-of-custody, laboratory analyses, data reduction, corrective action, and reporting are described. All policies and procedures have been structured in accordance with the NELAC Institute (TNI) Standards, DOD QSM(which includes 17025 standards), applicable EPA requirements, regulations, guidance, and technical standards. This Quality Systems Manual, laboratory Standard Operating Procedures (SOPs), and related documentation describe the quality systems, policies and procedures for Alpha Analytical.

Alpha Analytical performs chemical analyses for inorganic and organic constituents in water, seawater, soil, sediment, oil, tissue and air matrices. Alpha Analytical's goal is to produce data that is scientifically valid, technically defensible, and of known and documented quality in accordance with standards developed by The NELAC Institute (TNI) Standards and any applicable state or EPA regulations or requirements. It is the commitment of the President, Operations Director, Laboratory Technical Manager and Quality Assurance Officer to work towards continuous improvement of the operation, and towards meeting our customer's needs, requirements, and intended data usage. This continued commitment is built into every activity of the laboratory. It is the responsibility of Senior Management and the Department Managers to ensure that all associates familiarize themselves with, and comply at all times with, the quality systems, procedures and policies set forth in this manual, laboratory SOPs, and related documentation.

Alpha Analytical analyzes Proficiency Test (PT) samples, in accordance with the NELAC Institute (TNI) Standards and other regulatory programs, from a National Institute of Standards and Technology (NIST)-approved PT provider for the analytes established by EPA for water samples, and for other analytes and matrices. The specific analytes and matrices analyzed are based on the current scope of the laboratory services as documented in the laboratory SOPs and state certifications.

The technical and service requirements of all requests to provide analyses are thoroughly evaluated before commitments are made to accept the work. This includes a review of facilities and instrumentation, staffing, and any special QC or reporting requirements to ensure that analyses can be performed correctly and within the expected schedule. All measurements are made using published reference methods or methods developed by Alpha Analytical. Competence with all methods is demonstrated according to the procedure described in SOP/ 1739 prior to use.

Alpha Analytical has developed a proactive program for prevention and detection of improper, unethical or illegal actions. Components of this program include: internal proficiency testing, electronic data audits and post-analysis data review by the QA Officer; a program to improve employee vigilance and co-monitoring; and Ethics Training program identifying appropriate and inappropriate laboratory practices, instrument manipulation practices and consequences. Additionally, all associates are required to sign the Alpha Analytical *Ethics Agreement* form upon commencement of employment and complete annual refresher Ethics Training thereafter. This form clearly outlines the possible consequences of unethical or improper behavior, or data misrepresentation. All staff are required to report any suspected unethical conduct to management. Management will then investigate and determine if the situation was considered unethical and will take appropriate action as described in the Alpha Ethics policy.

It is the policy of the laboratory to discourage and reject all influence or inducements (whether commercial, financial or personal) offered either by customers or suppliers, which might adversely affect results or otherwise compromise the judgment or impartiality of the staff. It is the responsibility of the Operations Director and Laboratory Technical Manager to inform customers and suppliers of this policy when necessary.

In the event that any such influences or inducements are encountered, the staff is instructed to inform management immediately. It is the responsibility of the Operations Director and the Laboratory Technical Manager to take appropriate action to prevent recurrence.

3.3 References

External reference documents are available electronically in the Qualtrax system for staff to access the latest edition or version of the reference methods, regulations or national standards. The Quality Assurance Department maintains the electronic files in the Qualtrax system. Management purchases automated update services, where available, to provide the laboratory with the latest hardcopy edition, where electronic means is not available.

3.4 Definitions

Appendix A lists the definitions as adopted by the laboratory. The definitions are from the 2009 TNI standards.

4 Organization and Management

4.1 Legal Definition of Laboratory

Alpha Analytical is a full service analytical laboratory. Testing services include Drinking Water, Waste Water, Ground Water, Waste material and Air. Alpha Analytical is a privately held corporation incorporated in the state of Massachusetts. Alpha Analytical, Inc. does business as (D/B/A) Alpha Analytical.

Alpha Analytical has been in business since 1985. The types of businesses served include:

Consulting firms,
Engineering firms,
Waste Management Companies,
Industrial sites,
Municipal agencies
Department of Defense projects.

4.2 Organization

The laboratory operates a quality system approach to management in order to produce data of known quality. The laboratory organization provides effective communication and lines of authority to produce analytical data meeting customer specifications. The organizational design provides open communication while ensuring that pressures and day to day operating circumstances do not compromise the integrity of the reporting of the final data. See Appendix B for Organizational Chart.

The President is responsible for directing all areas of the company. The following job functions report to the President:

Operations Manager
Quality Assurance Officer
Marketing / Business Development / Sales
Financial Services
Human Resources

The Operations Manager is responsible for directing all laboratory operational areas of the company. The following job functions report to the Operations Manager:

Laboratory Technical Manager(s)
Customer Services Manager
Department Managers

The Laboratory Technical Manager(s) is(are) responsible for the laboratory data generated by the organics testing, inorganics testing and metals testing areas and the Air Technical Director is responsible for laboratory data generated by air analyses.

The Departmental Managers (Supervisors) have the following responsibilities:

The organics managers direct personnel in the organics extraction and instrumental laboratories.

The wet chemistry manager directs personnel and team leaders in the wet chemistry and/or microbiological testing areas.

The metals manager directs personnel and team leaders in the metals sample preparation and instrumental laboratories.

The Quality Assurance Officer is a member of the staff and reports directly to the President and has defined responsibility and authority for ensuring that the quality system is implemented and adhered to at all times. The Quality Assurance (QA) Officer is responsible for interacting and communicating certification requirements, implementing the Quality Systems Manual and reporting to the Laboratory Technical Manager and Senior Management the status of the quality program. The QAO oversees the Quality Systems Specialists and is responsible for oversight and/or review of quality control data and function independently from laboratory operations.

The Customer Services Manager is responsible for customer interactions, project coordination and laboratory personnel notification of project requirements.

The Marketing, Business Development and Sales personnel are responsible for increasing the volume of work from current customers and adding new customers to the base business of Alpha Analytical. The Marketing and Business Development personnel review all new work with the Laboratory Technical Manager, Operations Manager, President and/or Quality Assurance Officer before contractual commitment.

The CFO is responsible for maintaining and reporting on the financial status of the company. The CFO directs financial personnel on proper accounting procedures and maintaining the list of approved suppliers and subcontractors. The CFO reports directly to the President.

The Human Resource Director is responsible for personnel recruitment, hiring, performance reviews.

Personnel job descriptions define the operational function duties and responsibilities. Administration and Laboratory personnel assignments may include cross-functional training and work performance in multiple areas of the operations. Multiple function training ensures laboratory back up personnel during peak workloads.

During the absence of any staff member, assignment of alternative personnel occurs by memo or e-mail. The Manager or Supervisor authorizes the assignment. The naming of alternative personnel assures the continuing performance of critical tasks during the primary person's absence and ensures that lines of communication remain open for continued decision making. The deputy for the Laboratory Technical Manager is the Quality Assurance (QA) Officer. The deputies for the Quality Assurance (QA) Officer are the Quality Systems Specialists.

For the purposes of the NELAC Institute (TNI) Standards the Lead Laboratory Technical Manager is the Laboratory Technical Manager. The deputies for the Lead Technical Manager are the Quality Assurance (QA) Officer, and the Departmental Managers. The Laboratory Technical Manager meets the requirements specified in the Section 4.1.7.2 Volume 1, Module 2 of the 2009 TNI standards. If the Laboratory Technical Manager is absent for a period of time exceeding 15 consecutive calendar days, a full-time staff member meeting the qualifications of Laboratory Technical Manager will be designated to temporarily perform this function. The primary Accrediting Body shall be notified in writing if the Technical Manager's absence exceeds 35 consecutive calendar days.

4.3 Business Practices

Alpha maintains certification for the programs and analytes required by regulatory programs. The listing of qualifications from the various certifications, registrations and accreditation programs are available upon request. Alpha Analytical operates Monday to Friday from 7:30 a.m. to 5:30 p.m. Management prepares and posts the holiday schedule for the year indicating closed operations. Sample delivery occurs during normal operating hours unless arranged in advance.

Alpha's reputation depends upon timely reporting and quality data. The standard turnaround time for engineering and consulting firms is five business days from time of sample receipt. Standard turnaround for all other customers is ten business days from time of sample receipt. The time of sample receipt is when the verification of the chain of custody and samples meets the laboratory sample acceptance policy. Laboratory management must approve any special arrangements for rush or expedited turnaround time. The basis for data quality depends on customer, regulation and method performance criteria. Accuracy, precision, sensitivity and comparability are expressions of method performance criteria.

All work is performed in the strictest confidence. New and contract employees must review corporate policy and practice requirements for protecting customer confidentiality and proprietary rights. The review occurs during orientation and ethics training. It is the policy of the laboratory to release data to the customer authorized contact. Personnel assigned the duties of interacting with customers review project files and discuss data related only to the project. Personnel whose duties do not include routine customer contact must check with the customer service manager before discussing data with regulators or third parties

5 Quality System

Establishment, Audits, Essential Quality Controls and Data Verification

5.1 Establishment

The Mission Statement presents the policy and objectives for Alpha Analytical. The Quality Systems Manual provides the framework for the processes and operations to implement the Mission. The Quality Systems Manual and documentation controlled by the laboratory system detail the management authorized operations for achieving the objectives of the company.

The laboratory operates a quality system approach to management in order to produce data of known quality. Alpha Analytical is a full service laboratory designed to provide its customers with accurate, precise and reliable data within the best turn-around time and at the most reasonable prices. Alpha employs chemists of the highest training, ethics and caliber in the field of analytical chemistry. This and state-of-the-art instrumentation and automation combine to insure data of known and documented quality.

5.2 Quality Systems Manual

The QA Officer is responsible for the publication and distribution of the Quality Systems Manual and annual review. Management reviews and authorizes the manual. Implementation of major changes in the quality system occurs after revision of the appropriate Quality Systems Manual section and authorization by management.

The authorization of the Quality Systems Manual is documented electronically in Qualtrax. Updates of this manual occur at any time throughout the year. Document control procedures (SOP1729) apply to the distribution of the Quality Systems Manual. Controlled copies of the manual are maintained electronically within Qualtrax. Persons or organizations outside of Alpha Analytical may receive uncontrolled copies. Copies are distinctly indicated “Uncontrolled Documents” within the footer of each page.

5.3 Audits

Laboratory audits, both internal and external, review and examine the operations performed in the laboratory. Internal audits are conducted by qualified QA Specialists and external audits are reviews by external organizations to evaluate the ability of the laboratory to meet regulatory or project requirements. Internal audits are conducted on a frequency of annually, or method required.

A QA designee schedules internal process audits to ensure the completion of the annual audit of each operational area. The process audits are a more detailed review of the operations. Personnel from areas other than the one audited perform process audits.

The internal system audit is a review of the implementation of the documented quality system. The system audit includes sample tracking from receipt to disposal, a data audit of a completed report, and all operations not audited during the process audit.

The purpose of the internal system audit is:

- Verification that adequate written instructions are available for use;
- Analytical practices performed in the laboratory are consistent with SOPs;
- The quality control practices are applied during production;
- Corrective actions are applied as necessary;

Deviations from approved protocols are occurring only with proper authorization and documentation;

Reported data is correct and acceptable for reporting;

SOPs, quality records, analytical records, electronic data files are maintained properly; and

Personnel training files and records are satisfactory and current.

Before a scheduled internal audit, the assigned auditor reviews checklists, if used, and/or the SOP specific to the area. The checklist may be from an external source or prepared by the auditor. . After the audit, the auditor submits a summary or notes from the audit to the Laboratory Technical Manager or QAO as part of the audit report. The summary identifies discrepancies found during the audit. Technical personnel are responsible for the inspection and monitoring of in-process and final data. Personnel independent of those having direct responsibility for the work performed audit the quality system and processes.

Representatives sent by customers and government or accrediting agencies often perform external audits. These audits are most often announced inspections, but sometimes are not announced. The Quality Assurance Officer, Laboratory Technical Manager or assigned deputy, and/or appropriate Department Manager accompany the external audit team through the laboratory. The auditors receive a brief overview of company objectives, activities, and facilities. Interviews with essential supervisory staff and technical staff are arranged, along with retrieval of any documentation pertinent to the audit. Auditors usually provide a report on their findings shortly after the audit. The QA Officer receives the audit report and copies are provided to laboratory personnel for review. Corrective actions are identified and distributed to responsible parties for implementation in response to any cited deficiencies.

5.4 Audit Review

Management reviews internal and external audit reports to evaluate system effectiveness at the annual management review meeting. Tracking of the audit findings occurs through the nonconformance action process. The management and staff work together to establish a time line for resolving the audit findings. The Quality Assurance team tracks the time line and reports to the Laboratory Technical Manager on any outstanding audit findings. Approved corrective actions for DoD that are not implemented or avoided may result in loss of DoD ELAP accreditation and may result in work being discontinued until implementation is verified by DOD ELAP AB.

5.5 Performance Audits

Alpha Analytical participates in inter-laboratory comparisons and proficiency test programs required by customers and certifying agencies. The performance audits provide information on the data comparability of results generated by the laboratory. Test samples received by the laboratory are handled following routine laboratory procedures. Proficiency test samples are unpacked, checked against the packing slip and examined for damage. Reporting requirements and deviations to routine practices are noted as would be required for any project.

Analysts demonstrate proficiency by analyzing either an external proficiency test sample, an internally prepared blind test sample or Initial Demonstration of Capability (IDC) before independent operation of a test method. The results of performance audits serve several purposes. The QA Officer may use performance audits for evaluating analyst proficiency, laboratory performance in a specified area to facilitate laboratory improvement efforts, and/or to provide information to an accrediting agency on correction of past performance of an external performance audit.

5.6 Corrective Actions/Preventative Actions (CAPA)

The corrective action process at Alpha Analytical is detailed in SOP 1736. The corrective action program at Alpha Analytical uses the Nonconformance workflow in Qualtrax to document and follow through the corrective action/preventative action process for three main areas: nonconformance's within the laboratory, customer complaints and failed PT studies. The process ensures continuous improvement of company performance by preventing the recurrence of quality problems.

Nonconformance reports are tracked for closure date and the type. Reports to management include the listing of open nonconformance reports and the frequency of the type of nonconformance occurring. A QA designee monitors the completeness of the forms, as well as verifies the actions are complete and acceptable.

Customers will be notified within 5 days of any question(s) regarding validity of results.

5.7 Managerial Review

The management review occurs at least once per year as part of the strategic planning process. Documentation of the management review meeting is by recording the meeting minutes and listing the attendees. The focus of the quality management review is the frequency of the type of nonconformance, closure status, audit progress and other quality assurance actions. Meetings include discussion and progress on quality system initiatives since the last meeting.

Prior to the meeting, an agenda is distributed to all personnel expected to be in attendance. The meeting is chaired by the President. Minutes are taken and distributed at the conclusion of the meeting by a QA designee. If action is necessary on any issue, a Summary Report is generated and distributed to responsible parties for implementation. Actions are monitored by the QAO or designee until completion.

5.8 Essential Quality Control Procedures

The following general quality control principles apply to all tests. The manner implemented is dependent on the type of test performed. The laboratory SOP presents the specific quality control checks undertaken to ensure precision, accuracy and sensitivity of each test method. Deviations from the existing SOP are allowed only upon approval of the deviation by the department manager and Quality Assurance Officer. This documentation must be either in form of written notice or email.

Alpha Analytical uses quality control samples to evaluate the following:

1. Adequate positive and negative controls to monitor blanks, spikes, reference toxicants, zero blanks;
2. Adequate tests to define the variability and/or reproducibility of laboratory results;
3. Measures to ensure the accuracy of the test data including sufficient calibration and/or continuing calibrations, use of certified reference materials, proficiency test samples;
4. Measures to evaluate test performance, such as detection limits and quantitation limits or range of applicability such as linearity;
5. Selection of appropriate formulae to reduce raw data to final results such as linear regression, internal standards, or statistical packages;
6. Selection and use of reagents and standards of appropriate quality;

7. Measures to assure the selectivity of the test for its intended purpose;
8. Measures to assure constant and consistent test conditions for the method such as temperature, humidity, light, or specific instrument conditions.

   Note: All quality control samples are treated in the same manner as field samples.

All quality control measures are assessed and evaluated on an on-going basis, and quality control acceptance limits are used to determine the usability of the data. Control charts and/or calculated control limits monitor the long-term method performance by analyte, by instrument for water matrices. Routine evaluation and reporting of the control chart performance provides supervisors and management with additional performance measures to ensure data comparability. Control limits are recalculated when trends are observed.

Where no reference method or regulatory criteria exist, the laboratory specifies the acceptance/rejection criteria in the SOP. The test SOP specifies the QC samples performed per batch of samples. The quality control samples are categorized into the following, as appropriate to the method

- Method Blank
- Laboratory Duplicate
- Laboratory Control Sample (LCS)
- Laboratory Control Sample Duplicate (LCSD)
- Matrix Spike (MS)
- Matrix Spike Duplicate (MSD)

Selection of samples for Duplicate, Matrix Spike (MS) & Matrix Spike Duplicate (MSD)

2. Duplicate samples
   a. Samples will be selected if identified and requested by customer
   b. If no samples are identified by the customer then random samples will be analyzed within the batch as defined by the method, program or at a minimum batch of 20 samples.

3. Matrix Spike (MS) / Matrix Spike Duplicate (MSD) samples
   a. Samples will be selected if identified and requested by customer
   b. If no samples are identified by the customer then random samples will be selected and analyzed within the batch as defined by the method, program or at a minimum batch of 20 samples.
   c. If MS/MSD is not required, LCS/LCSD may be substituted for

precision and accuracy evaluation.
All DOD projects require MS/MSD.

The frequency is dependent on the reference method and test protocol. The following is the default requirement for quality control checks in lieu of any other guidance. The frequency for each quality control sample is generally one (1) per every 20 samples.

5.9 Data Reduction

After completion of the test procedure, the data reduction process begins.

Chromatography data may require the manual integration of peak areas or heights before reporting of results. The analyst must perform manual integration when software does not properly integrate or identify the peak. Manual integration must not occur for the purpose of achieving acceptable quality control or calibration. Signatures of analyst performing manual integrations can be found by electronic entry of analysts initials that can be traced to original signatures in the “Employee Signature Register”. The analyst notes the rationale for performing the manual integration using the M-Codes listed in the manual integration SOP 1731 and ensures the “TIC” marks from the software represent the integration area used for reporting the results. The analyst must minimize and avoid manual integration. The establishment of the proper integration parameters in the software reduces the number of manual integration occurrences.

The SOP for each test presents the formulas used for the specific test method. The formulas for the data calculations used throughout the laboratory are the following:

% Recovery (LCS)

$$\frac{MV}{TV} * 100 = \%R_{LCS}$$

where: *MV* = Measured Value
TV = True Value

% Recovery (MS or MSD)

$$\frac{MV - SV}{TV} * 100 = \%R_{MS}$$

where: *MV* = Measured Value
TV = True Value
SV = Amount found in sample

Average ($\overline{X}$)

$$\sum_{i-1}^{n} X_i \Big/ n = \overline{X}$$

where: $\overline{X}$ = Average of all values
X = Result of each measurement
n = Number of values

Relative Percent Difference (% RPD)

$$\frac{R_1 - R_2}{(R_1 + R_2)/2} * 100 = \%RPD$$

where: R_1 = Larger of two observed values
R_2 = Smaller of two observed values

% Difference (%D)

$$\frac{X - \overline{X}}{\overline{X}} * 100 = \%D$$

where: $\overline{X}$ = Average of all values
X = Result of measurement

Standard Deviation of the sample (S_x)

$$\sqrt{\frac{\sum \left(X - \overline{X}\right)^2}{n - 1}} = S_x$$

where: $\overline{X}$ = Average of all values
X = Result of each measurement
n = Number of values

Relative Standard Deviation (%RSD)

$$\frac{S_x}{\overline{X}} * 100 = \%RSD$$

where: $\overline{X}$ = Average of all values
Sx = Standard Deviation (n - 1)

Range of Logs (for microbiological enumeration analysis)

10% of routine samples are analyzed in duplicate and the range of logs is determined.

MDL (See 40CFR Part 136 for details)

where: *MDL* = The method detection limit

$$\left[\sqrt{\frac{\sum_{i=1}^{n} x_i^2 - \left(\sum_{i=1}^{n} x_i\right)^2 \Big/ n}{n-1}}\right] * t_{0.99} = MDL$$

X = Result of each measurement

n = Number of values

t(n-1,1 = .99) = The students' T value appropriate for a 99% confidence level and a standard deviation estimate with n-1 degrees of freedom. (See Students t Test Table)

Reporting Limit (RL)

Lowest calibration standard or greater

Control Limits

Upper Control Limit: $\overline{X} + 3 * S_x = UCL$

Lower Control Limit: $\overline{X} - 3 * S_x = LCL$

Warning Limits

Upper Warning Limit: $\overline{X} + 2 * S_x = UWL$

Lower Warning Limit: $\overline{X} - 2 * S_x = UWL$

Method of Standard Additions (MSA): (See EPA 7000A for details)

The simplest version of this technique is the single-addition method, in which two identical aliquots of the sample solution, each of volume Vx, are taken. To the first (labeled A) is added a known volume Vs of a standard analyte solution of concentration Cs. To the second aliquot (labeled B) is added the same volume Vs of the solvent. The analytical signals of A and B are measured and corrected for non-analyte signals. The unknown sample concentration Cx is calculated:

$$C_x = \frac{SB\ V_S\ C_s}{(SA - SB)\ V_X}$$

where SA and SB are the analytical signals (corrected for the blank) of solutions A and B, respectively. V_S and C_s should be chosen so that SA is roughly twice SB on the average, avoiding excess dilution of the sample. If a separation or concentration step is used, the additions are best made first and carried through the entire procedure.

Improved results can be obtained by employing a series of standard additions. To equal volumes of the sample are added a series of standard solutions containing different known quantities of the analyte, and all solutions are diluted to the same final volume.

For example, addition 1 should be prepared so that the resulting concentration is approximately 50 percent of the expected absorbance from the endogenous analyte in the sample. Additions 2 and 3 should be prepared so that the concentrations are approximately 100 and 150 percent of the expected endogenous sample absorbance.

The absorbance of each solution is determined and then plotted on the vertical axis of a graph, with the concentrations of the known standards plotted on the horizontal axis. When the resulting line is extrapolated to zero absorbance, the point of interception of the abscissa is the endogenous concentration of the analyte in the sample. The abscissa on the left of the ordinate is scaled the same as on the right side, but in the opposite direction from the ordinate. A linear regression program may be used to obtain the intercept concentration.

5.10 Document Control

The Document Control Procedure (SOP/1729) describes the process for controlled and uncontrolled documents. The use of the revision number allows for the retention of a previous document for historical information purposes.

Every document is assigned a unique identification number, which is present on each page of the document. A master list of documents includes the unique identification. Each controlled copy includes the revision number, published date and page number.

Full document control includes the status of each document: active, inactive or superseded/archived. Inactive documents are procedures not currently requested, but may be in the future. Archived documents are procedures replaced with a later revision. Authorized personnel must review and approve each document and any subsequent revisions before use in the laboratory. Personnel authorized to review and approve a document have access to all necessary information on which to base their review and approval. The history section of the document in Qualtrax includes a description of the nature of the document change.

Standard Operating Procedures (SOPs) are instructions for repetitive or standard operations performed by the laboratory. The SOP author is the person familiar with the topic. The standard format for writing SOPs is set-up as a template for administration and technical SOPs. Each SOP is peer reviewed, authorized by management, and QA before final publication and implementation. Authorized signatories for controlled documentation include one or more of the following personnel: Company President, Quality Assurance Officer, Laboratory Technical Manager, Department Manager, Department Team Leader. Personnel acknowledges approved documents as read, understood and agreed to through electronic attestation forms associated with each document as SOP Attestation Tests which reside in Qualtrax.

SOPs must receive evaluation and input by laboratory supervisors and key technical personnel. The content of each SOP must conform to applicable requirements of analytical methods and certification agencies. Within these constraints, the content of a SOP meets the needs of a particular area of the laboratory. A new or revised SOP is needed when regulatory programs update or add methods, the scope of the existing method is extended, or when activities are being performed without adequate documentation.

Updating, modifying and changing SOPs, forms and the contents of this QSM are prompt and part of the routine practices. The prompt modification of these documents ensures the documents reflect the current practices and operations of the laboratory. During annual review of a document, (including but not limited to: SOPs, Ethics Policy, Quality Systems Manual), requested changes are reviewed and the document reissued using the information and a new revision number is assigned and published in Qualtrax.

The laboratory maintains control over the possession and distribution of all documents that directly affect the quality of data. This includes, but is not limited to, documents such as the Quality Systems Manual, Standard Operating Procedures, customer instructions, Laboratory Work Instructions, data sheets, check lists and forms.

5.11 Detection Limits

Detection Limits (DLs), previously referred to as Method Detection Limits (MDLs), are determined for all analytes as specified in the Institute (TNI) Standards. DLs are determined for all new instrumentation, whenever there is a change in the test method or instrumentation that affects performance or sensitivity of the analysis. From these, detection limits, Reporting Limits (RLs), are established. The RL is the minimum concentration of an analyte that can be identified and quantified within specified limits of precision and bias during routine and analytical operating conditions.

Method Blanks are evaluated to determine an MDLb when performing an initial MDL study and annually thereafter.

Laboratory reporting limits lie within the calibration range, at or above the RL. For methods that require only one standard, the reporting limit is no lower than the low-level check standard, which is designed to verify the integrity of the curve at lower levels. If reporting limits are required below the lower level of the calibration curve, RL, or low-level check standard, method modifications are required. Refer to DL/LOQ SOP/1732. Note: "J" Estimated value: Upon customer request, the Target analyte concentration can be reported below the quantitation limit (RL), but above the Detection Limit (DL) with a "J" qualifier.

5.12 LOD/LOQ Studies

A. LOD (Limit of Detection) Verification - DOD only

1. LOD is required quarterly for all DOD projects. If there are no DOD projects for a particular quarter than LOD is not required for that quarter.

2. All sample-processing steps of the analytical method shall be included in the determination of the LOD.

3. The validity of the LOD shall be confirmed by ***qualitative*** identification of the analyte(s) in a QC sample in each quality system matrix containing the analyte at no more than 2-3X the LOD for single analyte tests, and > 1X up to 4X the LOD for multiple analyte tests. This verification must be performed on every instrument that is to be used for analysis of samples and reporting of data.

4. An LOD study is not required for any component for which spiking solutions or quality control samples are not available such as temperature. Where an LOD study is not performed, the laboratory may not report a value below the limit of quantitation.

B. LOQ (Limit of Quantitation) Verification

1. LOQ (Limit of Quantitation) verification is required quarterly for each target analyte. The validity of the LOQ shall be confirmed by successful analysis of a QC sample containing the analytes of concern in each quality system matrix. A successful analysis is one where the recovery of each analyte is within the established test

method acceptance criteria for accuracy

The LOQ study is not required for any component or property for which spiking solutions or quality control samples are not commercially available or otherwise inappropriate (e.g., pH)..

Refer to DL/LOQ SOP/1732

5.13 Range of Logs – Precision of Quantitative Methods - Microbiology

A. Precision of duplicate analyses is calculated for samples examined by enumerative microbiological methods according to the following procedure:

   a. Perform duplicate analyses on first 15 positive samples.

   b. Record duplicate analyses as D1 and D2 and calculate the logarithm of each result.

   c. If either of a set of duplicate results is <1, add 1 to both values before calculating the logarithms.

   d. Calculate the range (R) for each pair of transformed duplicates as the mean of these ranges.

6 Personnel

6.1 Laboratory Management Responsibilities

Management is responsible for communicating the requirements of the quality system, customer specifications and regulatory needs to all personnel. Management job descriptions detail the responsibilities of each position.

The H.R. Director has job descriptions for all positions in the laboratory defining the level of qualifications, training, and experience and laboratory skills. During initial training, management provides access to documented operations procedures, observes personnel performance, and evaluates personnel proficiency. Management documents technical laboratory staff's proficiency initially and on a continuing basis through use of laboratory control samples and purchased proficiency evaluation standards.

Management is responsible for verification of proper sample management and all aspects of data reporting. The communication of the operating practices of the laboratory is through the document control and attestation process.

Either the Quality Assurance Officer, Operations Director and/or Technical Managers have the authority to stop work due to non-conformances and have the authority to resume work after it has been stopped.

6.2 Laboratory Staff Requirements

Recruitment is the responsibility of the Operations Manager and HR Department, with input from other personnel as required. The Training Program procedure SOP/1565 details the process for completing requirements and training to ensure personnel have adequate skills and competence for the job function. Initial training includes ethics training, Qualtrax Training, QA Basics, IT/LIMs including computer security.

A job description details the necessary requirements for each job and includes position title, minimum educational requirements, skills, responsibilities and reporting relationships and any supervisory responsibility.

Initial training of new employees and contract staff includes laboratory ethics and quality policies, signing the Employee Signature Log, as well as execution of an Ethics Agreement. Any employee found to knowingly violate the Ethics Policy Agreement, report data values, that are not actual values obtained or improperly manipulated, or intentionally report dates and times of data analyses that are not the actual dates and times of analysis, will lead to disciplinary action, including termination, as outlined in Section V.K of the Employee Handbook. Each employee must report personally or anonymously to the Laboratory Technical Manager, QA Officer and/or Ethics Team Member any accidental or suspected intentional reporting of non-authentic data by others for follow up action. The review of the laboratory ethics and ethics training occurs annually with all personnel.

(DOD) All inappropriate and prohibited laboratory practices, as detailed in the DOD QSM 5.2, will be reported to the appropriate accrediting body within 15 business days of discovery. Records of corrective actions or proposed will be submitted within 30 business days. Failure to notify the AB within 15 business days will result in suspension of the DOD ELAP accreditation.

The Ethics program consists of the following key components:

- Ethics Policy /Agreement (Appendix F)
- Initial and annual ethics training
- Internal audits conducted annually
- Adherence to Manual Integration SOP/1731
- Ethical or Data Integrity issues reported to Lab Managers, QAO or HR Director
- Anonymous reporting to HR Director - This is accomplished by writing a detailed description of the suspected ethics breach and submitting the information, anonymously, to the Human Resource Director.

- “No-fault” policy encouraging reporting of incidences without fear of retribution
- Electronic tracking and audit trails through LIMs and instruments enabled where available.

6.3 Training

The Quality Systems Manual and related documentation is available to all employees. Cross training, supervisory training and other related training takes place on a scheduled and as-needed basis. Training ensures the communication and understanding of all personnel in the laboratory-documented procedures and practices.

All personnel undertake orientation-training sessions upon initial employment. Orientation training includes laboratory business practices, employment specifications, Ethics Policy, Quality Systems Manual, Chemical Hygiene Plan, and all SOPs required for the job function.

Managers ensure the training for new employees and review the continuing training for current employees. Training includes on-site and off-site programs presented by staff members, contractors, equipment manufacturers, and institutions of higher learning.

Training of new personnel to any job assignment takes place on-site according to the Training Program procedure. Laboratory personnel may perform their assigned methods/protocols without supervision only after documentation of acceptable proficiency. Training records lists the current training status.

On-the-job training includes demonstration of skills during job performance, initial demonstration of proficiency, and review of SOPs. Health and Safety training takes place on an annual basis with careful introduction to new principles. Personnel have access to the Chemical Hygiene Plan and Safety Data Sheets. On-site training includes side-by-side hands-on training, formal classroom type instruction on the SOP or a meeting to discuss procedural changes or to address questions related to the laboratory operation. All training is documented via the Training Attestation Form, which is signed by all in attendance that they understood and will implement what was presented to them.

Training is an on-going opportunity to evaluate the laboratory operations. The updating of SOPs, Quality Systems Manual and other related information documents all changes to the quality system. Training is documented via the Training Attestation Form or in Qualtrax with training test records.

Off-site training takes place on an as-needed basis. Recommendations and suggestions regarding educational programs come from all levels of staff. It is the employee’s responsibility to present a copy of any certificates or attendance information to the HR Director. The information is added to the individual’s training record.

6.4 Records

The QA Department is responsible for maintaining training records. Certificates, demonstration of capability forms and other records of training are placed in the individual’s training file.

Appropriate personnel are notified through email and/or Qualtrax or by the QA department when a revision is complete for the controlled version of a document. The manager of the area determines when a change is significant to require training.

Job descriptions are included in the training record files. The Human Resources Department reviews the job descriptions, Resumes and/or biosketches are kept on file with the Human Resources Department and the QA Department.

7 Physical Facilities – Accommodation and Environment

This laboratory facility has a total area of 25,000 square feet for each of the Westboro and Mansfield Facilities

The laboratory functional areas include:

Administration and offices

Sample receiving

Sample management
Air analysis (Mansfield Facility only)
Microbiological (Westboro Facility only)
General analytical chemistry
Metals sample preparation (Mansfield Facility only)
Organic sample preparation
Metals analysis (Mansfield Facility only)
Volatiles gas chromatography (GC)
Volatiles gas chromatography/mass spectrometry (GC/MS)
Volatiles air analysis (Mansfield Facility only)
Semivolatiles gas chromatography/mass spectrometry (GC/MS)
Semivolatiles gas chromatography (GC)
Miscellaneous facility mechanical and storage areas.

All chemicals are stored in appropriate cabinets and properly disposed of as required. All flammable solvents are stored in OSHA and NFPA approved cabinets. Acids are stored in OSHA acid cabinets. Separate waste areas houses the sample and chemical waste before pickup by a licensed waste hauler.

7.1 Environment

Lighting, noise, humidity, heating, ventilation and air conditioning satisfy the needs of the testing performed on the premises. The laboratory building design ensures regulated temperature control for analytical equipment. Air-handling systems minimize airborne contaminants that may jeopardize sample integrity or analytical performance.

The analytical instrumentation is in separate rooms from laboratory activities that involve the use of large quantities of organic solvents or inorganic acids. A separate room, in the Westboro facility, provides the facilities for the microbiological testing.

Standards and other materials requiring below 0°C storage temperatures are placed in freezers and separated from samples or potential contaminating materials. Refrigerators provide cooling needs for samples and materials with temperature requirements of below room temperature and greater than freezing. Sample and standard storage areas are monitored and controlled for temperature and recorded in the data logger system. Sample storage areas for volatiles are separated from other samples and monitored for any effects due to cross contamination.

Bulk hazardous waste containers are located away from the testing activities. Waste disposal uses lab pack procedures and those designated by the regulatory authorities. The Chemical Hygiene Plan and the Waste Management and Disposal SOPs (Westboro: SOP/1728 and Mansfield SOP/1797)) include the procedures for handling and disposing of chemicals used in the laboratory.

The working and storage environments are maintained in a safe and appropriate manner. A Chemical Hygiene Plan details the requirements for safety and chemical handling. Safety measures that protect property and personnel from injury or illness include: fume hoods, fire extinguishers, fire blankets, alarm systems, safety training, protective clothing, emergency showers, eyewashes, and spill control kits.

7.2 Work Areas

Good housekeeping is the responsibility of all personnel. Each person is responsible for assuring clean and uncluttered work areas. The job descriptions list specific housekeeping duties. Records, samples and waste materials are the common cause for clutter in the laboratory.

. Removal of administration and laboratory records to the record storage area occurs to reduce clutter and ensure traceability. The individual filling the laboratory record box, labels the box with a number, the contents, date and laboratory area. Authorized personnel assign and record into a permanent record the box number, discard date and box contents. Authorized personnel review the box label for number, discard date and contents. Boxes are stored onsite and off-site for the record retention period identified in the NELAC Institute (TNI) Standards and EPA regulations, whichever is more stringent.

Sample management personnel remove samples to the sample storage area after all data is correct and complete. Sample coolers are removed to a designated storage area for recycling. Samples are stored in the designated process storage areas until testing is complete. Sample removal from the process storage occurs after mailing of the final report. The sample management staff places the samples in the archive storage area for thirty days after report release. The archive sample storage area is not controlled or monitored. Based on customer specifications, samples are properly disposed or returned to the customer.

Waste materials, expired reagents, expired standards and materials are disposed of and not stored in the laboratory. Hazardous waste labeled accumulation containers in the laboratory collect designated waste streams for later bulk disposal. Laboratory personnel remove the less than five-gallon accumulation containers when full from the laboratory and place the containers in the bulk hazardous waste area. Refer to the Waste Management and Disposal SOPS for Westboro: SOP/1728 and Mansfield SOP/1797. Personnel identifying out of date reagents and standards remove the materials to the proper disposal area.

7.3 Security

Alpha Analytical provides a secure environment for our employees, guests, customers, samples and analytical data. Security procedures require that all exterior doors remain locked unless manned. Access to the laboratory is limited to employees and contractors. Visitors not under signed contract are required to sign the Visitors Log and must be accompanied by a laboratory employee at all times within the testing areas.

The defined high security area is the sample management area. Identification card locks on the internal doors control entry into the laboratory area.

All doors are locked after hours and require a key for entry. The security alarm continuously monitors for smoke and fire related heat. When the alarm is activated, the appropriate emergency response officers are notified. The local emergency offices have the emergency contact list for the laboratory.

8 Equipment and Reference Materials

8.1 Maintenance

The laboratory has a proactive equipment maintenance program. The laboratory maintains service contracts for most major equipment, which include routine preventative maintenance visits by the service provider. Technical personnel perform manufacturer's specified maintenance on a routine basis to ensure equipment operates at peak performance.

A brief summary of some common preventive maintenance procedures is provided in Appendix D. All instrument preventative and corrective maintenance is recorded in the maintenance logbook assigned to the equipment. After maintenance or repair, the instrument must successfully calibrate following the method SOP. Laboratory personnel must demonstrate quality control performance before sample analysis.

The laboratory maintains a stock of spare parts and consumables for analytical equipment. Backup instrumentation for some analytical equipment is available on site for use in case of major equipment failure. The person discovering or suspecting an equipment maintenance problem or failure tags the equipment with 'out of service' tag. If routine maintenance measures do not eliminate the problem, the Laboratory Technical Manager or Operations Director is notified and the appropriate equipment service provider is contacted.

All major laboratory equipment has individual and traceable maintenance logbooks in which to document manufacturer's recommended maintenance procedures, specific cleaning procedures, comments on calibration, replacement of small worn or damaged parts, and any work by outside contractors. The person performing routine or non-routine maintenance signs and dates the maintenance logbook. If an instrument is down for maintenance, a complete record of all steps taken to put it back into service is recorded including reference to the new calibration and quality control checks. Any equipment service providers working on the equipment are recorded in the logbook.

Record repetitive or on-going equipment problems other than normal maintenance requirements on nonconformance action forms. The nonconformance action form notifies management and the Quality Assurance Officer of a problem affecting the performance and data quality.

The laboratory groups some equipment into a single laboratory equipment maintenance logbook. Examples include: autopipets, thermometer calibration. The identity of each item is by serial number or a laboratory-designated item number. The same data recorded for major equipment applies to this documentation.

The maintenance records shall include:

- Equipment name;
- Manufacturer's name, type identification, serial number or other unique identification;
- Date received, date put into service, condition when received;
- Current location;
- Details of past maintenance and future schedule;
- A history of any damage, malfunction, modification or repair;
- Dates and results of calibration or verification.

The maintenance logbook may include the reference to the location of the equipment operational and maintenance manuals. The logbook may include the reference to laboratory run logbook or data files for the calibration and quality checks of daily or frequent calibrations.

The Courier Supervisor ensures that maintenance and records for transportation vehicles are complete. The purchasing process is used for ordering garage maintenance, the garage work order is reviewed, and the vehicle checked for condition. The Controller receives all paperwork for completion of the maintenance process.

8.1.1 Microbiology General Equipment Maintenance

Optics of the Quebec colony counter and microscope are cleaned prior to each use. The stage of the microscope is also cleaned and the microscope is kept covered when not in use.

Glassware is checked for residual alkaline or acid residue utilizing bromothymol blue (BTB) on each day of media preparation.

8.2 Equipment Listing

A listing of the major equipment used for testing is available upon request. The equipment list details the unique identification number, equipment location, serial number, model number, and purchase date. The unique identification number is attached to the piece of equipment.

The laboratory performs analyses using state of the art equipment. In addition to the major equipment, the most common equipment used in the laboratory are: thermometers, balances, autopipets, water baths, hot plates, autoclaves, pH meters, conductivity meters and a variety of labware. The SOPs list the calibration and verification requirements for all laboratory equipment used in measurements.

8.3 Laboratory Water

Laboratory water is purified from central DI and RO water systems and piped to all laboratory areas. The QA Department samples the laboratory grade water and submits the samples for analysis by the lab to document the water meets the drinking water certification criteria. The Laboratory Water Logbook lists the daily conductivity checks and acceptance criteria for the laboratory water. The laboratory documents the daily, monthly and annual water quality checks. Please refer to Table 8-1 for tested parameters, monitoring frequency and control limits for each parameter (SOP/1738). Additional parameters may be tested for at the laboratory's discretion.

When additional treatment occurs in the test area, that test area records the water quality checks from the most frequently used tap. At a minimum the quality of the laboratory grade water is monitored daily by conductivity measurements. Records of the daily checks are found in the Laboratory Water Logbook. If out of specification results occur, a nonconformance action form is submitted.

TABLE 8-1

Parameter	Monitoring Frequency	Control Limits
Conductivity	Daily	<2 μmhos/cm @ 25°C
pH	Daily	5.5 - 7.5
Total Organic Carbon	Monthly	< 1.0 mg/L
Total Residual Chlorine	Monthly	< detection limit
Ammonia	Monthly	< 0.1 mg/L
Metals: Cd, Cr, Cu, Pb, Ni and Zn	Monthly (Required Annually)	< 0.05 mg/L
Total Metals	Monthly (Required Annually)	< 0.1 mg/L

Heterotrophic Plate Count (Westboro only)	Monthly	< 500 CFU/mL
Water Quality Test (Biosuitability) (Westboro only)	Annually	0.8 – 3.0 ratio

8.4 Reference Materials

Reference materials include: Class 1 weights, NIST thermometers and reference standards. Timers used for DOD projects are NIST-certified. Logbooks record the reference materials used for calibration and verification. The Department Manager or QA Department maintains any certificates received with the reference materials. Laboratory personnel record in the standards logbook the reference standards date received, unique identification number, expiration date and number of containers. Each laboratory area records the unique identifier on the reference standard certificate and the Department Manager maintains the certificate. The identifier allows traceability from the certificate to the analytical data.

9 Measurement Traceability and Calibration

9.1 General Requirements

All measuring operations and testing equipment having an effect on the accuracy or validity of tests are calibrated and/or verified before put into service and on a continuing basis. The results are recorded in the instrument specific logbook. The laboratory has a program for the calibration and verification of its measuring and test equipment. The program includes all major equipment and minor equipment such as balances, thermometers and control standards. The Quality Systems Manual and method SOP describe the calibration records, frequency and personnel responsibilities.

9.2 Traceability of Calibration

The program of calibration and/or verification and validation of equipment is such that measurements are traceable to national standards, where available. Calibration certificates indicate the traceability to national standards, provide the results, and associated uncertainty of measurement and/or a statement of compliance with identified metrological specifications. A body that provides traceability to a national standard calibrates reference standards. The laboratory maintains a permanent file of all such certifications.

9.3 Reference Standards and Materials

Alpha Analytical has a program for calibration and verification of reference standards. The results and program are recorded in the appropriate instrument logbook. Required in-service checks between calibrations and verifications are described in method SOPs and are recorded in the appropriate instrument logbook.

Calibration standards are maintained within the area of consumption. A logbook of use is maintained and use is limited strictly to method required calibrations. Each calibration standard is identified as to test method used, date received, date opened, and expiration date. Calibrations are verified by using a second source or lot number of the calibration standard. Calibration check procedures are stated in applicable test method SOPs.

Preparation of standards must be performed using Class A glassware. Class A glassware must be used for all processes involving quantitative analyses. The only exception to this is when the method specifically requires or recommends plastic (ie. EPA 537.1).

Reference standards of measurement in the laboratory's possession (such as calibration weights or traceable thermometers) are used for calibration only and no other purpose.

Standards and reagents are uniquely identified as outlined in Westboro SOP 1745 and Mansfield SOP 1816.

9.4 Calibration General Requirements

Each calibration record is dated and labeled with method, instrument, analysis date, analyst(s) and each analyte name, concentration and response. For electronic processing systems that compute the calibration curve, the equation for the curve and the correlation coefficient are recorded in the appropriate instrument logbook. This is also true for manually prepared curves. Calibrations are tagged to the specific instrument through use of the instrument logbook and or sequence file documentation.

Initial calibration requires a standard curve that brackets the expected sample concentration. Initial calibration generally uses three to five standards depending on the equipment and reference method specifications. Before the start of each analytical sequence, initial calibration is verified by using a continuing calibration standard. Calibration verification or continuing calibration uses the same standard as the ICAL unless method specifies otherwise. The ICV is from a second source or lot number than that used for initial calibration. The acceptance criteria for the continuing calibration standard must meet acceptance criteria before analysis of any samples. When the acceptance criteria is not within limits, review maintenance protocols and perform any necessary maintenance before starting the initial calibration sequence.

9.5 Equipment Calibration

The SOP used for the analysis defines the instrument and equipment calibration required. The following defines the general practices for equipment calibration of selected equipment.

9.5.1 Gas Chromatography/Mass Spectrometry (GC/MS)

The GC/MS is hardware tuned before performing the initial and continuing calibrations. Results must meet the peak ratio specifications of the analytical methods. For volatiles analyses, bromofluorobenzene (BFB) is used, and for semivolatiles analyses, decafluorotriphenylphosphine (DFTPP) is used for instrument tuning.

The mass spectrometer response is calibrated by analyzing a set of five or more initial calibration solutions, as appropriate, for each GC/MS method. Each solution is analyzed once, unless the method or the customer requires multiple analyses. The relative response factor for each analyte is calculated for internal standard calibration. The calibration factor for external standard calibration is calculated using the expressions found in the laboratory method SOP. Calibration is acceptable when all acceptance criteria are within method criteria.

The initial calibration is verified through the analysis of a continuing calibration standard every 12 hours. The concentration of the continuing calibration standard is dependent on the requirements of the specific method. The relative response factors for all analytes of interest are calculated and verified against the initial calibration mean relative response factors. The percent difference (%D) for each analyte is calculated and must be less than the acceptance criteria stated in the method.

An acceptable continuing calibration run must have measured percent differences for the analytes within method specified ranges. If any criteria for an acceptable calibration are not met, either instrument maintenance must be performed until the continuing calibration analysis meets all criteria or a new initial calibration is established before any samples are analyzed. No samples may be analyzed unless the acceptance criteria are met for the initial and continuing calibration.

Additional quality control samples are part of the GC/MS analysis. These include internal standards, surrogates, method blanks, instrument blanks, laboratory control samples, matrix spikes and matrix spike duplicates. The frequency and control criteria are defined in the laboratory SOP.

9.5.2 Gas Chromatography (GC)

Internal standard calibration or external standard calibration is utilized for analysis by GC. The method-specified number of calibration standards is used. Each solution is analyzed once and the analyte relative response factors or calibration factors are calculated. The mean relative response factor for each analyte is then obtained by using the expression in the formula listed in the SOP. Integrated areas are utilized for these expressions.

For multiple response pesticides, PCBs or hydrocarbons the quantitation consists of the average of selected peaks or the integration of the area defined by a reference standard. The SOP details the integration criteria for each compound.

The initial calibration is verified through the analysis of a continuing calibration standard every 12 hours or 20 samples. The concentration of the continuing calibration standard is dependent on the requirements of the specific method. The relative response factors for all analytes of interest are calculated and verified against the initial calibration mean relative response factors. The percent difference (%D) for each analyte is calculated. The percent drift (%d) may be calculated when calibration factors are used for quantitation.

An acceptable continuing calibration must have measured percent differences or percent drift for the analytes within method specified ranges. Should any criteria for an acceptable calibration not be met, either instrument maintenance is performed until the continuing calibration analysis meets all criteria, or a new calibration is established before any samples are analyzed. No samples may be analyzed unless the acceptance criteria are met for the initial and continuing calibration.

Other standard checks may be required for a specified reference method. Instrument performance checks specified in the reference method must be performed and be within the acceptance limits stated in the reference method. Additional quality control samples are part of the GC analysis. These include internal standards, surrogates, method blanks, instrument blanks, laboratory control samples, matrix spikes and matrix spike duplicates. The frequency and control criteria are defined in the laboratory SOP.

9.5.3 Cold Vapor Atomic Absorption Spectrophotometry (CVAA)

An initial calibration is performed daily with freshly prepared working standards that bracket the expected concentration range of the sample. A minimum of a three-point calibration curve is acquired which must have a correlation coefficient of 0.995 or better. The initial calibration is verified every 10 samples. The continuing calibration is required to be within method-defined criteria, depending on the analytical method employed. Continuing calibration blanks are run at the same frequency. Analysis of samples cannot begin until an initial calibration verification has been performed and is found to be within ± 10% of the true value.

9.5.4 Inductively Coupled Plasma Emission Spectrophotometry-Mass Spectrometry (ICP-MS)

Initial calibration and instrument tune is performed daily, not to exceed 24 hours, and continuing calibrations are performed every 10 samples. Initial calibration consists of a minimum of three standards and a Blank that bracket the expected concentration range of the samples. Analysis of samples cannot begin until an initial calibration verification has been performed and is found to be within method-defined criteria. The continuing calibration is required to be within method-defined criteria. Interference check standards are performed at the beginning of the sequence. Acceptance criteria are stated in the SOP.

9.5.5 Inductively Coupled Plasma Emission Spectrophotometry (ICP)

Initial calibration is performed daily, not to exceed 24 hours, and continuing calibrations are performed every 10 samples. Initial calibration consists of one standard and a Blank that bracket the expected concentration range of the samples. Analysis of samples cannot begin until an initial calibration verification has been performed and is found to be within 5% of the true value for EPA Method 200.7 and 10% for SW846 6010 methods. The continuing calibration is required to be within 10% of the true value. Interference check standards are performed at the beginning and end of the sequence. Acceptance criteria are stated in the SOP.

9.5.6 Thermometers

Laboratory thermometers are checked annually for accuracy against certified, NIST traceable thermometers. Correction factors derived from the annual calibrations are applied to temperature readings where applicable. The analyst records the corrected temperature for all observations.

NIST traceable thermometers are calibrated professionally and re-certified every year. Records of thermometer calibrations are retained by the QA Department. All thermometers are tagged with the ID number, correction factor to be applied and the expiration of the calibration check.

NOTE: Electronic-based thermometers are calibrated on an annual basis. Thermometers are tagged with calibration information by the vendor, including the ID number, correction factor to be applied and the expiration of the calibration check. Certificates are kept on file in the QA Department.

Thermometers are not used past the calibration expiration date or if the thermometer is not reading properly. Replacement thermometers are calibrated and the maintenance logbook is updated when a change in the thermometer is required due to breakage, damage or expired calibration.

9.5.7 Balances

Calibration checks are performed for each day of use, for each balance. The calibration consists of a minimum of two weights, which bracket the weight to be measured. Additional calibration check procedures are performed on balances utilized in Microbiology laboratory. This additional procedure consists of a deflection test, which is performed to ensure that 100mg is detectable at a weight of 150 grams.

The balance logbook lists the acceptance criteria and performance criteria for the various balances used in the laboratory. Calibration weight measurements must meet the acceptance criteria listed on the record form.

Each balance is serviced and calibrated by a professional semi-annually. Balances are labeled with the balance number, date of service and the expiration date for the annual service check. The balance number used for any measurements requiring traceability is recorded with measurement data. Balances are not used past the expiration date or when the weight check is not within acceptable criteria. The accuracy of the calibration weights used by Alpha Analytical is verified annually by an accredited calibration service.

9.5.8 Mechanical volumetric pipettes

Delivery volumes for the mechanical volumetric pipettes (i.e. Eppendorf) are checked and recorded gravimetrically before use and on a quarterly basis. The verification is performed at the volume of use or bracketing the volume range of use. The check must be within the criteria stated in the laboratory logbook. Pipettes failing acceptance criteria are tagged and removed from service until repaired and the criteria are met, or discarded and replaced. Automatic pipettes are labeled with a unique ID number, volumes verified and expiration date.

9.5.9 Ion Chromatography

The ion chromatograph calibration is by analyzing a set of five or more initial calibration solutions, with concentrations of analytes appropriate to the analytical methods. The concentrations must bracket the expected concentration range of the samples analyzed. Procedures for verifying the calibration curve are method specific. The initial calibration is performed at the start of each day. The calibration curve is verified at least after every 20 samples.

9.5.10 pH Meters

pH meters are calibrated prior to use for each day of use. The meter is calibrated following the procedure for pH analysis. The records of the calibration are recorded in an instrument logbook or in the raw data for the analysis being performed. At least two buffer solutions that bracket the measurement range for the analysis are used for calibration. A second source check standard is used at the end of a run to verify meter stability. Buffer solutions used for calibration are NIST certified. Standard buffer solutions are not retained or re-used. The lot number of the buffer solutions is recorded in the data record to ensure traceability of the measurement to NIST.

9.5.11 Conductivity Meters

Three calibration standards of potassium chloride (KCL) solutions are analyzed annually on each instrument range. The calibration standards are used to verify instrument performance. The acceptance criteria are defined in the test SOP. If unacceptable performance is found, the cell is cleaned and rechecked. The cell is not used until satisfactory performance is achieved.

A single KCL standard solution is used to calibrate each range of the instrument. A second standard is used to check the calibration each day the meter is used. The check standard is near the measurement range for the samples to be analyzed. The acceptance criterion is $\pm$ 20% of the true value. The meter is labeled with expiration date for the annual calibration. A check standard that is NIST traceable is used to allow traceability. The check standard is performed at the end of the analysis run or at least after every 20 samples.

9.5.12 Autoclave

The date, contents, sterilization time and temperature, total cycle time and analyst's initials are recorded each time the autoclave is used. Autoclave cycles must be completed within 45 minutes when a 15 minute sterilization time is used. Autoclave timing mechanisms are checked quarterly with a stopwatch to verify timing controls. A maximum temperature thermometer is used with each cycle to ensure the sterilization temperature is reached.

Spore strips or ampoules are used weekly to confirm sterilization. BTSure ampoules are utilized as follows: An indicator ampoule is placed in most challenging area of sterilizer. Load is processed according to standard operating instructions. Remove from sterilizer and allow to cool for a minimum of 10 minutes. (Chemical indicator on label changes from green to black when processed.) Place the autoclaved indicator and un-autoclaved control indicator in an upright position in the plastic crusher provided. Gently squeeze crusher to break glass ampoules. Incubate both indicators at 55-60^{o}C for 24 hours. Examine appearance for color change. Yellow color indicates bacterial growth. No color change indicates adequate sterilization.

Calibration is conducted and certified annually by an outside service provider and recorded. Certificates are kept on file. Routine maintenance includes cleaning the autoclave seal to ensure freedom of caramelized media and cleaning drain screens to remove any debris buildup. For the efficient operation of the unit, overcrowding is avoided.

10 Test Methods and Standard Operating Procedures

10.1 Methods Documentation

Analysis consists of setting up proper instrument operating conditions, executing acceptable calibrations, monitoring instrument performance tests, analyzing prepared samples, and collecting data from the analyses. The test method SOP describes the instrumental analysis procedures, quality control frequencies and acceptance criteria. EPA accepted methods, national recognized methods or customer-specified methods are the basis for performance criteria, instrument conditions and the steps of the procedure. The method performance requirements of the published methods are followed unless otherwise specified by the customer.

The reference methods define the instrument operating conditions. In many of the reference methods, a range or general guidance on the operating conditions is defined. Documented modifications to the operating conditions clarify the reference methods or improve the quality of the results. In all cases where the method modifications are adopted, the performance criteria from the reference method must be met. Modifications to the operating conditions are stated in the SOP. Changes in the operating conditions made at the time of the analysis are documented in the appropriate laboratory or sequence log. A revision to the SOP takes place, when a day to day change in the operating condition improves performance for all matrices.

The laboratory SOPs include the operation of measurement equipment. The SOPs contain the - following information, as applicable:

- The equipment used in the procedure, including equipment type
- Equipment calibration and process for obtaining the measurement from the calibration
- The step by step instructions to perform the measurement
- Acceptance criteria for the calibrations
- Corrective action for failed acceptance criteria, including assessment of previous calibration results
- The basis used for the calibration standards such as traceability to NIST or EPA or demonstration of comparability
- Frequency at which the equipment will be calibrated, adjusted and checked
- The records maintained to document the calibration and use of measurement equipment
- The calibration status for the equipment
- The environmental conditions necessary before measurement equipment may be calibrated or used for measurement
- Allowed adjustments to measurement equipment, including software, which will not invalidate the laboratory analysis
- Maintenance of the equipment and record keeping to track performance before and after maintenance is completed
- Define the standards, reagents and sample handling, interferences, preservation, and storage in order to assure measurement performance

10.2 Standard Operating Procedures (SOPs)

Alpha Analytical maintains SOPs that accurately reflect all phases of current laboratory activities such as assessing data integrity, nonconformance actions, handling customer complaints, sample receipt and storage, purchasing of all materials, and all test methods. These documents include equipment manuals provided by the manufacturer, internally written documents, and published methods with documented changes or modifications.

Copies of all SOPs are accessible to all personnel in electronic form through Qualtrax. Each SOP clearly indicates the published date of the document and the revision number.

10.3 Laboratory Method Manual (s)

All SOPs are posted as secure documents in the Alpha Qualtrax system. Directories are available for each laboratory area and administrative area in appropriate subfolders. Each SOP includes or references where applicable:

1) identification of the test method and where applicable;
2) applicable matrix or matrices;
3) method detection limit;
4) scope and application;
5) summary of method;
6) definitions;
7) interferences;
8) safety;
9) equipment and supplies
10) reagents and standards
11) sample collection, preservation, shipment and storage;
12) quality control;
13) calibration and standardization;
14) procedure;
15) calculations;
16) method performance;
17) pollution prevention;
18) data assessment and acceptance criteria for quality control measurements;
19) corrective actions for out-of-control data;
20) contingencies for handling out-of-control or unacceptable data;
21) waste management;
22) references; and
23) any tables, diagrams, flowcharts and validation data.

In cases where modifications to the published method have been made by the laboratory or where the referenced method is ambiguous or provides insufficient detail, these changes or clarifications are clearly described in the SOP.

10.4 Test Methods

The laboratory uses appropriate methods and procedures for all tests and related activities within its responsibility (including sampling, handling, transport and storage, preparation of items, estimation of uncertainty of measurement and analysis of test data). The method and procedures are consistent with the accuracy required, and with any standard specification relevant to the calibrations or tests concerned. When the use of mandated methods for a sample matrix is required, only those methods are used. Where methods are employed that are not required, the methods are fully documented and validated and are available to the customer and other recipients of the relevant reports.

The customer requests the reference method for sample analysis usually based on the regulatory program. The customer services staff may assist the customer with method selection when the customer specifies the regulatory program, but is unsure of the correct method required. The Laboratory Technical Manager or Quality Assurance Officer recommends methods for non-regulatory programs. In all cases, recommendation of methods is based on customer-defined method performance criteria. Customer services may recommend a procedure that meets the customer method performance criteria.

10.5 Method Validation/Initial Demonstration of Method Performance

Before acceptance and use of any method, satisfactory initial demonstration of method performance is required. In all cases, appropriate forms are completed and retained by the laboratory and made available upon request. All associated supporting data necessary to reproduce the analytical results is retained. Initial demonstration of method performance is completed each time there is a significant change in instrument type, personnel or method.

10.6 Sample Aliquots

The aliquot sampling process from a submitted sample is part of a test method. The laboratory uses documented and appropriate procedures and techniques to obtain representative sub-samples. Sample aliquots removed for analysis are homogenized and representative portions removed from the sample container. Personnel record observations made during aliquot sampling in the test method logbooks.

10.7 Data Verification

Calculations and data transfers are subject to appropriate checks which is a 3 tier approach. The initial analyst verifies all of his work, a secondary review of 100% of the initial is conducted by a an independent qualified analyst. A Customer Services representative reviews data for project and method performance requirements where applicable. A QA representative reviews data for project and method performance requirements when requested by a Customer. Final report review is performed by an authorized company signatory.

For drinking water suppliers, every effort is made to notify the Customer within 24-hours of obtaining valid data of any results that exceed any established maximum contaminant level or reportable concentration. Analyst or Department Supervisor notifies the Customer Services Department of the sample number(s), Customer name, analysis and sample results (preliminary or confirmed). The Customer Services Department notifies the customer.

The laboratory Report Generation and Approval SOP describes the practices to ensure that the reported data is free of transcription errors and calculation errors. Manually entered data into the LIMS is dual entered and checked by the LIMS to minimize transcription errors. The laboratory test method SOP describes the quality control measures used to assure method performance before reporting data.

10.8 Labeling of Standards and Reagents

The purchase, receipt and storage of consumable materials used for the technical operations of the laboratory include the following:

a) The laboratory retains records of manufacturer's statement of purity, of the origin, purity and traceability of all chemical and physical standards.
b) Original reagent containers are labeled with the date opened and the expiration date.
c) Detailed records are maintained on reagent and standards preparation. These records indicate traceability to purchased stocks or neat compounds and include the date of preparation and preparer's initials.

d) Where calibrations do not include the generation of a calibration curve, records show the calibration date and type of calibration standard used.

e) All prepared reagents and standards are uniquely identified and the contents are clearly identified with preparation date, concentration and preparer's initials. These procedures are outlined in Westboro SOP/1745 and Mansfield SOP/1816.

10.9 Computers and Electronic Data Related Requirements

Computers or automated equipment are used for the capture, processing, manipulation, recording, reporting, storage or retrieval of test data. The laboratory ensures that computer software and firmware is documented and adequate. The goals of the software development methodology, existing system validations and the change control system are to ensure that:

the software systems perform the required functions accurately,

the users understand how to use the system, and

auditors can assure themselves of the validity of the analytical data.

The computer systems used at Alpha Analytical are purchased. A coordinated effort is made with the supplier to assure the computer operations meet the laboratory requirements for data integrity. Alpha Analytical has a formal validation program of its computer systems. The validation program is a comprehensive program to ensure data transmitted, reported or manipulated by electronic means is correct and free of errors. The validation and verification approach is separated into three areas.

1. New software is developed and validated using test data. Records of validation include the test data report, date and initials. Where formulas are part of the program, documentation includes manual verification of the final calculated values. New software includes the development of macros for spreadsheets and other tools using commercial software packages.

2. Reasons for changes to software are identified through flaws in existing documentation or the need to improve system processes and are documented on the Nonconformance Report. Final implementation of the change is documented on the nonconformance action form. The tracking and timelines of making the change is readily available. This process also provides the complete documentation of all software and electronic data reporting problems. All nonconformance identified with electronic data process result in corrective action that are reported to management before or at the bi-weekly executive meeting. Customers will be notified prior to any changes to software or hardware that will adversely affect customer electronic data. This information is provided by IT department to QA and Project Managers to be communicated to appropriate customers.

Verification of system integrity is through routine maintenance, protection from unauthorized access and electronic verification programs. Routine maintenance including system backups are performed on a scheduled basis. The backup process and password and access protections are defined in the Computer System Backup Control SOP/1562 and Computer Security SOP/1563. Electronic verification may be used to assure the commercially purchased software is performing at its original specifications. This includes virus checking of all network operation at least once per week. Documentation of all verification and maintenance operations is retained.

11 Sample Handling, Sample Acceptance Policy and Sample Receipt

The Sample Login and Custody procedures define the process for sample management from sample receipt through analysis and to disposal. These procedures detail the process for sample receipt, records and storage pending analysis.

Customers or Alpha's Couriers deliver samples to the laboratory during normal business hours. Sample receiving occurs in the sample management area.

Customer service personnel place bottle orders. The orders are filled following the bottle order instruction form. Blanks are prepared as needed with minimal storage. All glass containers are packed to minimize or prevent breakage. The containers are placed in plastic coolers or shipping packages and Chain-of Custody forms, seals (if requested) and labels enclosed. The bottle order is shipped by third party, picked up by the customer or customer representative or delivered by Alpha courier to the customer.

11.1 Sampling Supplies

11.1.1 Sample Containers

Sample containers provided by Alpha Analytical include labels, preservatives and a blank chain of custody form. Preservatives and containers are lot controlled and verified as appropriate for the indicated type of analysis.

Each lot of containers used for the collection of samples for microbiological analysis is checked for sterility prior to distribution. Sterility checks are performed by Microbiology staff and results recorded in Microbiology Sample Container Sterility Log.

Sample Containers for collecting Air samples (TO-15) are cleaned and prepared according to SOP 2190 "Cleaning and Preparation Procedures for Equipment used to collect Air sample for analytis of Volatile Organic Compounds".

11.1.2 Chain of Custody

Chain of custody forms must accompany all samples received by Alpha personnel. The chain of custody form indicates the sample origin and arrival at the laboratory and identifies the analyses requested.

11.1.3 Reagent Water

Alpha Analytical supplies laboratory pure water for field QC blanks. Water used for volatile organics must be free of volatile compounds below the method detection limit. The quality of the laboratory water is monitored for conductivity once per day. Additional water quality criteria may be monitored based on customer specific requests. The water quality in the laboratory is monitored for chemical parameters as required by the EPA certification manual for drinking water (Water Quality Monitoring SOP/1738).

11.2 Sample Tracking

Alpha Analytical uses an internal chain-of-custody in LIMs for sample tracking control purposes. When requested or required by regulation a legal custody program is used in addition to the routine laboratory practices. Legal custody practices must be arranged at the time of contractual commitment.

For legal custody the process must include complete and continuous records of the physical possession, storage, and disposal of sample containers, collected samples, sample aliquots, and sample extracts or digestates. For legal custody a sample is in someone's custody if:

1. It is in one's actual physical possession;
2. It is in one's view, after being in one's physical possession;
3. It is in one's physical possession and then locked up so that no one can tamper with it;
4. It is kept in a secured area, restricted to authorized personnel only.

The routine sample handling and tracking process includes unique identification of all sample containers, initials of the person removing the sample from the sample management area and documentation of the date of sample removal for disposal.

Samples are assigned a unique identification number from the LIMS program. Each sample container label includes a unique identifier for the container. The person handling the sample is recorded along with the unique identifier in the container tracking records in LIMS.

ALPHA ANALYTICAL utilizes a custom designed Laboratory Information Management System (LIMS) to uniquely identify and track samples and analytical data throughout the facility. The LIMS log-in, is initiated by the Sample Custodian when the following information is entered into the computer:

- Quote number (unique to the project if requested)
- Project name or description
- Analyses requested (per matrices received)
- Sample number (unique to this sample)
- Sample descriptions (customer ID, including number of received containers)
- Date received
- Date(s) and time(s) collected
- Date analytical results are due

11.2.1 Chain of Custody

Chain of custody forms must accompany all samples received by Alpha personnel. The chain of custody form indicates the sample origin and arrival at the laboratory and identifies the analyses requested.

- Customer's name and address
- Notation of special handling instructions
- Additional comments or instruction for the laboratory
- Purchase order number(s), if applicable

Alpha Job Numbers (Process for assigning numbers)

Alpha Job Numbers are unique #'s automatically designated by our LIMS computer system for every individual customer project.

There are 3 parts to this number:

- All numbers start with the letter "L"
- The next two numbers are the last two numbers of the current year.
- The last five numbers are pulled sequentially by the LIMS as each Login personnel requests a new number for a job.

For example…. L0904165 ---- Year 2009 and 4,165th job to be logged in this year.

The Alpha Job Number then may contain as many extensions as there are individual samples in a job. L0904165-01 is the first sample, L0904165-02 is the second and so on. Each sample may contain as many as 26 containers as the containers are designated with the letters of the Alphabet, and each container receives its own bar-coded label. For example, L0904165-09A is the first container of the 9th sample listed on a customer's Chain of Custody.

Each container is labeled with a unique identifier, a label with a unique identifier number is placed on each sample container. Once labeled, the sample containers are placed in the appropriate storage area.

11.3 Sample Acceptance Policy

The sample management personnel check for proper sample labeling, preservation and handling at the time of arrival at the laboratory. The customer and customer services manager specifies the proper sample preservation, containers, cooling and other criteria on the project review form and in the LIMS. Sample management staff record all observations and immediate notify customer services of any discrepancies or questions arising during sample receipt.

It is possible for samples or sample containers to be lost, damaged, or determined to be unsuitable, for whatever reason, after initial receipt at Alpha Analytical. The problem is brought to the attention of a customer services manager who reports it to the customer. Plans for disposition of the affected samples or container are agreed upon with the customer, carried out, and recorded in the project records. Sample hold times and preservations are listed on the Alpha website (www.alphalab.com) under Support Services "Sampling Reference Guide".

11.4 Sample Receipt Protocols

The sample management staff receives all samples. A unique job number is assigned to each shipment of samples received from a customer. The in-house records for the incoming job, including the internal Chain-of -Custody, are initiated with a Sample Delivery Group (SDG) form. The customer, and Alpha courier and/or the sample management personnel sign the sample custody form at the time of receipt at the laboratory. Samples received via overnight courier are signed on the bill of lading. The bill of lading, SDG form and the sample custody form are completed for external courier delivered samples.

The sample management staff examines the shipping containers, their contents, and accompanying customer documentation. Information about the sample identification, the location, date and time of collection, collector's name, preservation type, sample type, presence and condition of custody seals, the state of preservation of the samples and other required information is noted on the SDG form. Any discrepancies in documentation or problems with sample condition such as appropriate sample containers, thermal preservation variation, holding times and adequate sample volumes are noted and brought to the attention of the customer via the nonconformance action form, The login staff or project manager contacts the client via email or or by phone. The Customer Services Manager provides clarification or further instruction to the sample management staff on the processing of the samples that are incomplete or missing required information.

The sample management staff logs the samples in the LIMs and a durable label for each container is printed. The custodian attaches each label to the appropriate sample container. The following information is recorded for tracking internal custody: laboratory sample ID, customer sample ID, sample matrix and storage location. Sample receipt and log-in specifically requires: date and time of laboratory receipt of sample(s); sample collection date; unique laboratory ID code; field ID code supplied by sample submitter; requested analyses; signature or initials of data logger; comments from inspection for sample acceptance or rejection and in some cases, sample bottle codes.

11.5 Storage Conditions

Alpha Analytical stores samples under proper environmental conditions to ensure their integrity and security. Samples are stored at temperatures that meet specifications of the methodology, regulatory agencies and customer directives. Refrigerators are monitored and controlled to be within 4 ± 2°C. Chemical, temperature, holding times and container storage requirements are listed in the LIMS project database.

Customer Quality Assurance Project Plans may list preservation requirements differing from the laboratory. The sample management staff reviews project information for projects specific handling. Addition of chemical preservative to sample containers normally is done in the field at the time of sampling. Chemical preservation and temperature preservation checks at the time of receipt are recorded except for volatile organic compounds, bacteria, sulfite, and dissolved oxygen preservation. Any differences from laboratory or customer specific requirements are recorded on nonconformance action forms and contact made with the customer by the Customer Services Manager or designee.

Sample storage facilities are located within the sample management area, walk-in custody refrigerator or in designated sample storage areas within the analytical departments. Internal chain-of-custody procedures and documentation pertaining to sample possession, removal from storage, and transfer are outlined in the sample custody procedure. Samples are returned to the sample storage area after the sample portion is removed for analysis. Extracts and digestates are tracked and follow the same internal custody operation. Extracts and digestates are removed to the waste disposal area after analysis for proper disposal.

Sample storage precautions are used to ensure that cross contamination does not occur during sample storage. Refrigerator storage blanks are monitored bi-weekly for volatile compounds.. The storage blank information allows the assessment of potential cross contamination in the sample storage refrigerator.

Temperatures of cold storage areas are recorded continuously in the data logger system. Corrective action is done as necessary when temperatures are not within the control criteria. In both the Westboro and Mansfield facilities, Automated Data loggers are linked to thermocouples in custody refrigerators and freezers in the Sample Storage areas as well as department standards/storage refrigerators and freezers. The Data logger is calibrated and certified by an outside vendor annually and on a quarterly basis for DOD standards/storage refrigerators and freezers. If there is a catastrophic failure of custody refrigerators, a record of all samples affected and customers associated with such samples are notified of any samples affected by the failure. Refrigerators and/or freezers not connected to the Data Logger system have temperatures measured with NIST traceable thermometers. Temperature records indicate the thermometer or sensor (Data logger) used for obtaining the measurement.

11.6 Sample Disposal

Samples are held for 21 calendar days after the report is released to the customer. Upon written customer request samples may be held longer in an uncontrolled area. Requests for controlled sample storage must be arranged at the time of contractual commitment. Air canister samples are held for 3 days after the report is released to the customer.

An authorized waste carrier is contracted to pick up waste as needed and dispose of it, in accordance with all regulatory requirements. Post-analysis disposition of samples is dependent upon project specific requests. Remaining sample material may be returned to the customer, safely discarded, or archived for a specific time prior to disposal. The waste disposal SOP 1797 defines the specific requirements for sample disposal and other waste disposal operations.

The sample management staff are responsible for the archival and disposal of raw samples, extracts and digestates. Raw and prepared samples may not be archived or disposed until all of the designated analyses are complete and resultant analytical data is sent to customers. Samples in storage are retained a minimum of 21 calendar days after reporting the results to the customer. Any samples requiring more than 21 calendar days are archived. Air canister samples requiring storage more than 3 business days require prior approval.

When a customer has requested the return of samples, the sample management staff prepares and ships the samples according to the same custody procedures in which the samples were received and following any customer specified requirements. Protection of the samples during delivery is ensured by the implementation of special packaging procedures. Packages are delivered by a commercial carrier whose procedures for protecting the samples are not within the control of this laboratory. Customers are informed that a commercial carrier will deliver their samples if required.

12 Records

Alpha Analytical has a record system that produces accurate records, which document all laboratory activities. The laboratory retains records of all original observations, calculations and derived data, calibration records and a copy of the test for ten years minimum. The system retains records longer than the minimum upon the request of authorized customers, agencies or another regulator. Note: Ohio VAP requires notification before disposal of any VAP records.

12.1 Record Keeping System and Design

The record keeping system allows reconstruction of laboratory processes that produced the analytical data of the sample.

a) The records include the names of personnel involved in sampling, preparation, calibration or testing.

b) Information relating to laboratory facilities equipment, analytical methods, and activities such as sample receipt, preparation, or data verification are documented.

c) The record keeping system provides retrieval of working files and archived records for inspection and verification purposes.

d) Documentation entries are signed or initialed by responsible staff.

e) Generated data requiring operator logging on appropriate logsheets or logbooks are recorded directly and legibly in permanent ink

f) Entries in records are not obliterated by any method. Corrections to errors are made by one line marked through the error. The person making the correction signs and dates the correction.

g) Data entry is minimized by electronic data transfer and ensuring the number of manual data transcriptions is reduced.

12.2 Records Management and Storage

1. Records including calibration and test equipment, certificates and reports are safely stored, held secure and in confidence to the customer.
2. The laboratory maintains hardware and software necessary for reconstruction of data.
3. Records that are stored or generated by computers have hard copy or write-protected backup copies.
4. Alpha Analytical has established a record management system, for control of hard copy laboratory notebooks.
5. Access to archived information is carefully controlled. These records are protected against fire, theft, loss, environmental deterioration, vermin, and in the case of electronic records, electronic or magnetic sources. Any access to the archive is documented in the Data Archive Access Logbook which is used strictly by the QA Department.
6. In the event that Alpha Analytical transfers ownership or goes out of business, there is a plan to ensure that the records are maintained or

transferred according to the customer's instructions. A plan will be developed to maintain continuity of our record keeping systems as requested and/or required by both state and federal laws.

Alpha Analytical retains all original hard copy or electronic raw data for calibrations, samples, and quality control measures for ten years, including:

1. Analysts work sheets and data output records,
2. Reference to the specific method,
3. Calculation steps including definition of symbols to reduce observations to a reportable value,
4. Copies of all final reports
5. Archived SOPs,
6. Correspondence relating to laboratory activities for a specific project,
7. All nonconformance action reports, audits and audit responses,
8. Proficiency test results and raw data,
9. Data review and cross checking.

The basic information to tie together analysis and peripherals such as strip charts, printouts, computer files, analytical notebooks and run logs for Alpha Analytical includes:

1. Unique ID code for each Laboratory sample or QC sample;
2. Date of analysis;
3. Instrument identification and operating conditions;
4. SOP reference and version;
5. Calculations;
6. Analyst or operator's initials/signature.

In addition, Alpha Analytical maintains records of:

1. Personnel qualifications, experience and training
2. Initial and continuing demonstration of proficiency for each analyst
3. A log of names, initials and signatures for all individuals who are responsible for signing or initialing any laboratory records. Use of electronic signatures has been approved by regulatory agencies.

12.3 Laboratory Sample Tracking

A record of all procedures to which a sample is subjected while in the possession of the laboratory is maintained. These include but are not limited to records pertaining to:

a) Sample preservation including appropriate sample container and compliance with holding time requirement; If the time of the sample collection is not provided, the laboratory must assume the most conservative time of day (i.e., earliest).

b) Sample identification, receipt, acceptance or rejection and log-in;

c) Sample storage and tracking including shipping receipts, transmittal forms, and internal routing and assignment records; this includes inter-laboratory transfers of samples, extracts and digestates.

d) Sample preparation including cleanup and separation protocols, ID codes, volumes, weights, instrument printouts, meter readings, calculations, reagents;

e) Sample analysis;

f) Standard and reagent origin, receipt, preparation, and use;

g) Equipment receipt, use, specification, operating conditions and preventative maintenance;

h) Calibration criteria, frequency and acceptance criteria;

i) Data and statistical calculations, review, confirmation, interpretation, assessment and reporting conventions;

j) Method performance criteria including expected quality control requirements;

k) Quality control protocols and assessment;

l) Electronic data security, software documentation and verification, software and hardware audits, backups, and records of any changes to automated data entries;

m) Automated sample handling systems;

n) Records storage and retention; and

o) Disposal of hazardous samples including the date of sample or sub-sample disposal and the name of the responsible person.

p) The COC records account for all time periods associated with the samples.

q) The COC records include signatures of all individuals who had access to individual samples. Signatures (written or electronic) of all personnel who physically handle the samples. Time of day and calendar date of each transfer or handling procedure.

r) Common carrier documents.

13 Laboratory Report Format and Contents

The Process Planning and Control Procedure details the recording and reporting of data as required by the customer and in accordance with relevant environmental regulations.

Customers specify the report delivery and deliverables required for the work submitted. Report delivery includes standard turnaround and rush turnaround. Customers specify the delivery address or multiple addresses and method of delivery such as U.S. Mail, facsimile or electronic at the start of the project. Alpha Analytical provides data deliverables in hardcopy or electronic format. At the start of any project, the electronic deliverable formats required must be received before sample arrival. Affidavits are required with each report or series of reports generated for a particular project for Ohio VAP reports.

Reporting packages are available for routine regulatory reporting requirements. Regulatory reporting packages include only the information requested by the regulatory agency. In addition to regulatory report packages, Alpha Analytical prepares a standard report format. The standard report format includes:

1. Title: “Certification of Analysis”
2. Name and address of the laboratory
3. Laboratory Job Number, page number and total number of pages included in the report.
4. Name and address of the customer
5. Alpha sample number, Customer identification, Sample location
6. Samples identified that do not meet the sample acceptance requirements for project.
7. Date of sample receipt, sample collection, preparation or extraction date and time (if applicable), analysis date and time, report date and analyst
8. Identification of data reported by subcontractors
9. Test name and reference method number
10. Delivery method and sampling procedures when collected by lab personnel
11. Deviations or modifications that affect data quality and/or data integrity. These deviations or modifications are included in narrative statements and/or data merger files.
12. Statement that results relate only to the sample tested
13. Statement that report must be copied in full unless the laboratory provides written permission for partial copies
14. Glossary, References and limits of liability
15. Units of measure and reporting detection limit
16. Quality control data for: % Recovery surrogates, % Recovery of LCS, % RPD of LCSD, Blank analysis, % Recovery Matrix Spike, %RPD of Laboratory Duplicates, as applicable
17. Signature, title and date of report

18. A "Certificate/Approval Program Summary" page is included at the end of the report that identifies analytes for which Alpha Analytical holds certification and for those analytes reported that it does not. This summary also includes the certification numbers for either NELAP certified states, State certifications (e.g. Massachusetts laboratory certification identification number)..
19. Alpha Analytical does not accept samples from private residents for drinking water analysis and therefore maximum contaminant levels are not necessary. If Alpha were to change its policy and report drinking water samples, MCLs would be included with the report.

Results transmitted by facsimile or other electronic means include a statement of confidentiality and return of the materials at the laboratory's expense.

The laboratory notifies the customer in writing of any circumstance that causes doubt on the validity of the results. The amended or modified report lists the change, reason for the change, affected page numbers, date of the amendment and authorized signature. The customer will be notified prior to changes in LIMs software or hardware configurations that will adversely affect customer electronic data.

13.1 Data Qualifiers

The following data qualifiers are used in conjunction with analytical results depending on the definition, state or regulatory program and report type.

Note: "J" Estimated value: Upon customer request, the Target analyte concentration can be reported below the quantitation limit (RL), but above the Method Detection Limit (DL) with a "J" qualifier as long as there is a LOD study on file. (See section 5.11)

Data Qualifier	Qualifier Information	Regulatory Requirement
A	Spectra identified as "Aldol Condensation Product".	CT RCP, NC
B	The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at <5x the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than 10x the concentration found in the blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone) For DOD related projects, flag applies to detectable concentration of target analyte in the blank that exceeds ½ the LOG or is greater than 1/10 the concentration in the field sample	EPA Functional Guidelines 'MassDEP MCP, CT RCP, NJ-TO15/LL-TO15; NJ Tech Guidance 2014, DOD QSM 5.1
C	Co-elution: target analyte co-elutes with a known lab standard (i.e. surrogates, internal standards, etc.) for co-extracted analyses.	
D	Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.	NJ-TO15/LL-TO15 - Air only EPA Functional Guidelines; EPA Region 2,5
DL	Same was re-analyzed at a dilution. Qualifier applied to sample number.	

E		Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.	EPA Region 2,5 CT RCP, NJ-TO15/LL-TO15
G		The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.	In-house/Forensics.
H		The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.	THE NELAC INSTITUTE (TNI) STANDARDS
I		The lower value for the two columns has been reported due to obvious interference.	In-house.
J		Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).	CT RCP (for TICs),
JN (NJ)		Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.	EPA Functional Guidelines 'NJ-TO15-LL
ND	DU-J	Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for same-related analysis	In-house
P	All DU	The RPD between the results for the two columns exceeds the method-specified criteria.	MassDEP MCP, CT RCP
Q	All DU	The quality control sample exceeds the associated acceptance criteria. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)	
R	All DU	Analytical results are from sample re-analysis	Customer-specific

RE	All DU	Analytical results are from sample re-extraction.	Customer-specific
S		Analytical results are from modified screening analysis	

13.2 Compound Summation for Organic Analyses

In order to be compliant with regulations from certain states, Alpha Analytical has created the following Summation Rules to cover reporting "Total Analytes". The following are an example of several compounds that can be reported as "Totals":

Volatiles:	
1,3-Dichloropropene, Total	cis + trans isomers
Xylenes, Total	m/p + o isomers
1,2-Dichloroethene, Total	cis + trans isomers
Trihalomethanes, Total	Chloroform + Bromoform +
	Dibromochloromethane +
	Dichlorobromomethane
PCBs:	
PCBs, Total	Sum of reportable Aroclors
	(all Aroclors reported for the project)

The following are the summation rules that the LIMs uses to calculate the Total values:

Summation Rules:		
H + H = H		Key:
H + J = J		H = Hit (above RL)
J + J = J		J = J-flagged value
H + ND = H		ND = U-flagged value
J + ND = J		
ND + ND = ND		

The ND values are considered "0" during the calculations.
The "E" flagged values (over the calibration) are ignored and not utilized during the calculations.
Any "N" flagged values (do not report) are ignored and not utilized during the calculations.
For dual-column analysis, the Total is reported as part of column "A" data, unless all individuals are reported from "B" column.

For analytical group summations, the Total is reported based on the associated "Reporting List". For example, if only 7 Aroclors are requested, then the Total is based on 7 Aroclors, not 9.

The RL and MDL for Totals will always be the lowest of the individual compounds used in the summation.

For each Total summation, two values are calculated: TOTALH (calculated from all associated hits above the R L– used in DU reporting formats) and TOTALJ (calculated from all associated hits and J flagged values – used in DJQL reporting formats). Total concentrations are calculated for all samples and QC samples (however, recoveries are not calculated since they are only calculated for the compounds spiked)

If a Total summation is requested, the individual compounds must also be reported.

14 Outside Support Services and Supplies

When Alpha Analytical purchases outside services and supplies in support of tests, the laboratory uses only those outside services and supplies that are of adequate quality to maintain confidence in the tests. Differences between Request/Tender and Contracts must be resolved before work commences.

The Purchasing SOP/1726 describes approval and monitoring of all suppliers and subcontractors used by the laboratory. Where no independent assurance of the quality of outside support services or supplies is available, the laboratory ensures that purchased equipment, materials, and services comply with specifications by evaluating method performance before routine use.

The laboratory checks shipments upon receipt as complying with purchase specifications. The use of purchased equipment and consumables is only after the evaluation and compliance to the specifications is complete. The Purchasing SOP/1726 describes the details for receipt and inspection of purchased product.

The Purchasing SOP describes the process for raising, review and placement of purchase orders. It is company policy to purchase from third party certified suppliers and subcontractors wherever possible. Purchases must be from suppliers approved by the Laboratory. Laboratory or sampling subcontractors specified by the customer are noted as “Trial” on the purchase order. This identifies the subcontractor as a non-approved subcontractor. All DoD work that is subcontracted must comply with Alpha’s management system and must comply with the QSM standard and is subject to DoD customer approval.

The laboratory maintains list of approved vendors (Form 18302) and subcontractors from whom it obtains support services or supplies required for tests.

14.1 Subcontracting Analytical Samples

Customers are advised, verbally and/or in writing, if any analyses will be subcontracted to another laboratory. Any testing covered under the NELAC Institute (TNI) Standards that requires subcontracting, will be subcontracted to another THE NELAC Institute (TNI) Standard accredited laboratory for the tests to be performed. The laboratory approves testing and sampling subcontractors by review of current state, national or other external parties’ certifications or approvals. This document must indicate current approval for the subcontracted work. Any sample(s) needing special reports (*i.e.*, MCL exceedance) will be identified on the chain of custody when the laboratory subcontracts with another laboratory. Subcontractor Laboratory Certifications are located in Qualtrax under Customer Services folder

The Sample Receipt and Login Procedure describes the process for sample handling when subcontracting samples. Customer notification of subcontracted work is in writing or verbally before releasing samples to the subcontractor.

The review of subcontractor documents for completeness and meeting the specifications defined for the project follows the laboratory process for reporting and verification of process data. The Reporting Deparment Designee is responsible for receiving the order reviews the information supplied by the subcontractor instead of the Department Supervisor.

15 Customer Relations

15.1 Customer Service

The majority of the customer services occur from personnel in the administration, sample receiving and sampling areas. Customer service involves inquiries into services offered, technical consulting, placing orders, and receiving orders, providing updates on the status of orders and completing orders. Personnel interacting with customers must document and review customer specific project requirements. Call Tracker is used to document communications with customers (SOP/1723). Personnel must document customer interactions following the appropriate laboratory procedures. Each person must communicate deviations, modifications and customer requests following the laboratory defined procedures.

15.2 Project Management

During staff meetings the laboratory management reviews requests for new work. The Operations Director and/or Laboratory Technical Manager address all capacity and capability issues. Where conflicts in workload arise, customer notification is immediate. The Project Communication Form (PCF) contains the documentation of all project information. Cooperation between laboratory and customer services staff allows direct communication and scheduling. Management arranges complex scheduling and coordination between departmental areas. Documentation of approval for waivers from the DoD QSM requirements must be documented on a project specific waiver. This documentation needs to be in writing and readily available for review.

15.3 Complaint Processing

The laboratory staff documents all customers or other parties' complaints or concerns regarding the data quality or laboratory operations. The Nonconformance Report records complaints, correcting the concern, and resolving the concern with the customer or other party. The process uses the same form and process as the nonconformance action process. Where repetitive corrective actions indicate a problem, an audit of the area, Customer Inquiry and Complaint SOP/1722 is immediate to ensure the corrective action has effectively solved the concern.

16 Appendix A – Definitions/References

The following definitions are from Section 3.0 of the 2009 TNI Standard. The laboratory adopts these definitions for all work performed in the laboratory.

Acceptance Criteria: specified limits placed on characteristics of an item, process, or service defined in requirement documents. (ASQC)

Accreditation: the process by which an agency or organization evaluates and recognizes a laboratory as meeting certain predetermined qualifications or standards, thereby accrediting the laboratory. (TNI)

Accuracy: the degree of agreement between an observed value and an accepted reference value. Accuracy includes a combination of random error (precision) and systematic error (bias) components which are due to sampling and analytical operations; a data quality indicator. (TNI)

Aliquot: A discrete, measured, representative portion of a sample taken for analysis. (EPA QAD glossary)

Analyst: The designated individual who performs the "hands-on" analytical methods and associated techniques and who is the one responsible for applying required laboratory practices and other pertinent quality controls to meet the required level of quality. (TNI)

Analyte: The specific chemicals or components for which a sample is analyzed; it may be a group of chemicals that belong to the same chemical family, and which are analyzed together. (EPA Risk Assessment Guide for Superfund; OSHA Glossary)

Analytical Uncertainty: A subset of Measurement Uncertainty that includes all laboratory activities performed as part of the analysis. (TNI)

Assessment: The evaluation process used to measure or establish the performance, effectiveness, and conformance of an organization and/or its systems to defined criteria (to the standards and requirements of laboratory accreditation. (TNI)

Assessment (Clarification): The evaluation process used to measure the performance or effectiveness of a system and its elements against specific criteria.

Assessment Criteria: the measures established by The NELAC Institute (TNI) Standards and applied in establishing the extent to which an applicant is in conformance with the NELAC Institute (TNI) Standards requirements.

Audit: A systematic and independent examination of facilities, equipment, personnel, training, procedures, record-keeping, data validation, data management, and reporting aspects of a system to determine whether QA/QC and technical activities are being conducted as planned and whether these activities will effectively achieve quality objectives. (TNI).

Batch: Environmental samples, which are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents. A

preparation batch is composed of one (1) to twenty (20) environmental samples of the same quality systems matrix, meeting the above mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be 24 hours. An **analytical batch** is composed of prepared environmental samples (extracts, digestates or concentrates), which are analyzed together as a group. An analytical batch can include prepared samples originating from various quality system matrices and can exceed 20 samples. (TNI)

Bias: The systematic or persistent distortion of a measurement process, which causes errors in one direction (i.e., the expected sample measurement is different from the sample's true value). (TNI)

Blank: a sample that has not been exposed to the analyzed sample stream in order to monitor contamination during sampling, transport, storage or analysis. The blank is subjected to the usual analytical and measurement process to establish a zero baseline or background value and is sometimes used to adjust or correct routine analytical results. (TNI)

Blanks include:

Equipment Blank: a sample of analyte-free media, which has been used to rinse common sampling equipment to check effectiveness of decontamination procedures.

Field Blank: blank prepared in the field by filling a clean container with pure de-ionized water and appropriate preservative, if any, for the specific sampling activity being undertaken. (EPA OSWER)

Instrument Blank: a clean sample (e.g. distilled water) processed through the instrumental steps of the measurement process; used to determine instrument contamination. (EPA-QAD)

Method Blank: A sample of a matrix similar to the batch of associated samples (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences are present at concentrations that impact the analytical results for sample analyses, (TNI)

Reagent Blank: (method reagent blank): a sample consisting of reagent(s), without the target analyte or sample matrix, introduced into the analytical procedure at the appropriate point and carried through all subsequent steps to determine the contribution of the reagents and of the involved analytical steps. (QAMS)

Blind Sample: a sub-sample for analysis with a composition known to the submitter. The analyst/laboratory may know the identity of the sample but not its composition. It is used to test the analyst or laboratory's proficiency in the execution of the measurement process.

Calibration: set of operations which establish, under specified conditions, the relationship between values of quantities indicated by a measuring instrument or measuring system, or values represented by a material measure or a reference material, and the corresponding values realized by standards. (TNI)

1) In calibration of support equipment the values realized by standards are established through the use of Reference Standards that are traceable to the International System of Units (SI).

2) In calibration according to test methods, the values realized by standards are typically established through the use of Reference Materials that are either purchased by the Laboratory with a certificate of analysis or purity, or prepared by the Laboratory using support equipment that has been calibrated verified to meet specifications.

Calibration Range: The range of values (concentrations) between the lowest and highest calibration standards of a multi-level calibration curve. For metals analysis with a single-point calibration, the low-level calibration check standard and the high standard establish the linear calibration range, which lies within the linear dynamic range.

Calibration Curve: the graphical relationship between the known values, such as concentrations, of a series of calibration standards and their instrument response. (TNI)

Calibration Method: A defined technical procedure for performing a calibration.

Calibration Standard: A substance or reference material used to calibrate an instrument. (TNI)

Certified Reference Material (CRM): Reference material, accompanied by a certificate, having a value, measurement uncertainty, and stated metrological traceability chain to a national metrology institute. (TNI)

Chain of Custody Form: Record that documents the possession of the samples from the time of collection to receipt in the laboratory. This record generally includes: the number and types of containers; the mode of collection; collector; time of collection; preservation; and requested analyses. See also Legal Chain of Custody Protocols (TNI)

Clean Air Act: the enabling legislation in 42 U.S.C. 7401 *et seq*., Public Law 91-604, 84 Stat. 1676 Pub.L. 95-95, 91 Stat., 685 and Pub. L. 95-190, 91 Stat., 1399, as amended, empowering EPA to promulgate air quality standards, monitor and to enforce them.

Confirmation: Verification of the identity of a component through the use of an approach with a different scientific principle from the original method. These may include, but are not limited to: Second column confirmation, Alternate wavelength, Derivatization, Mass spectral interpretation, Alternative detectors, or Additional cleanup procedures (TNI)

Customer: Any individual or organization for which items or services are furnished or work performed in response to defined requirements and expectations. (ANSI/ASQ E4-2004)

Congener: A member of a class of related chemical compounds (e.g., PCBs, PCDDs)

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA/Superfund): the enabling legislation in 42 U.S.C. 9601-9675 et seq., as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), 42 U.S.C. 9601 et seq., to eliminate the health and environmental threats posed by hazardous waste sites.

Conformance: an affirmative indication or judgment that a product or service has met the requirements of the relevant specifications, contract, or regulation; also the state of meeting the requirements. (ANSI/ASQC E4-1994)

Consensus Standard: A standard established by a group representing a cross-section of a particular industry or trade, or a part thereof. (ANSI/ASQ ANSI/ASQ E4-2004)

Continuing calibration verification: The verification of the initial calibration that is required during the course of analysis at periodic intervals. Continuing calibration verification applies to both external standard and internal standard calibration techniques, as well as to linear and non-linear calibration models. (IDQTF)

Corrective Action: the action taken to eliminate the causes of an existing nonconformity, defect or other undesirable situation in order to prevent recurrence. (ISO 8402)

Completeness: the percentage of measurements judged to be valid compared to the total number of measurements made for a specific sample matrix and analysis.

Data Quality Objectives (DQO):

Data Reduction: the process of transforming raw data by arithmetic or statistical calculations, standard curves, concentration factors, etc., and collation into a more useable form. (TNI)

Definitive Data: Analytical data of known quality, concentration, and level of uncertainty. The levels of quality and uncertainty of the analytical data are consistent with the requirements for the decision to be made. Suitable for final decision-making. (UFP-QAPP)

Demonstration of Capability: a procedure to establish the ability of the analyst to generate analytical results of acceptable accuracy and precision. (TNI)

Detection Limit: (previously referred to as Method Detection Limit –MDL) the lowest concentration or amount of the target analyte that can be identified, measured, and reported with confidence that the analyte concentration is not a false positive value. See Method Detection Limit.

Detection Limit (DL) (Clarification): The smallest analyte concentration that can be demonstrated to be different from zero or a blank concentration at the 99% level of confidence. At the DL, the false positive rate (Type I error) is 1%.

Document Control: the act of ensuring that documents (and revisions thereto) are proposed, reviewed for accuracy, approved for release by authorized personnel, distributed properly and controlled to ensure use of the correct version at the location where the prescribed activity is performed. (ASQC)

Environmental Data: Any measurements or information that describe environmental processes, locations, or conditions; ecological or health effects and consequences; or the performance of environmental technology. (ANSI/ASQ E4-2004)

False Negative: An analyte incorrectly reported as absent from the sample, resulting in potential risks from their presence.

False Positive: An item incorrectly identified as present in the sample, resulting in a high reporting value for the analyte of concern.

Federal Insecticide, Fungicide and Rodenticide Act (FIFRA): the enabling legislation under 7 U.S.C. 135 *et seq*., as amended, that empowers the EPA to register insecticides, fungicides, and rodenticides.

Federal Water Pollution Control Act (Clean Water Act, CWA): the enabling legislation under 33 U.S.C 1251 et seq., Public Law 92-50086 Stat. 8.16, that empowers EPA to set discharge limitations, write discharge permits, monitor, and bring enforcement action for non-compliance.

Field Measurement: The determination of physical, biological, or radiological properties, or chemical constituents; that are measured on-site, close in time and space to the matrices being sampled/measured, following accepted test methods. This testing is performed in the field outside of a fixed-laboratory or outside of an enclosed structure that meets the requirements of a mobile laboratory.

Field of Accreditation: Those matrix, technology/method, and analyte combinations for which the accreditation body offers accreditation. (TNI)

Finding: an assessment conclusion, referenced to a laboratory accreditation standard and supported by objective evidence that identifies a deviation from a laboratory accreditation standard requirement. (TNI)

Finding (Clarification): An assessment conclusion that identifies a condition having a significant effect on an item or activity. An assessment finding may be positive or negative and is normally accompanied by specific examples of the observed condition (ANSI/ASQ E4-2004).

Holding Times: The maximum time that can elapse between two (2) specified activities. (TNI)

The maximum times that samples may be held prior to analysis and still be considered valid or not compromised. (40 CFR part 136)

Inspection: An activity such as measuring, examining, testing, or gauging one or more characteristics of an entity and comparing the results with specified requirements in order to establish whether conformance is achieved for each characteristic. (ANSI/ASQC E4-1994)

Internal Standard: A known amount of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical method. (TNI)

Isomer: One of two or more compounds, radicals, or ions that contain the same number of atoms of the same elements but differ in structural arrangement and properties. For example, hexane (C6H14) could be n-hexane, 2-methylpentane, 3-methylpentane, 2,3-dimethylbutane, 2,2-dimethylbutane.

Laboratory: Body that calibrates and/or tests. (ISO 25)

Laboratory Control Sample (however named, such as laboratory fortified blank, spiked blank or QC check sample): a sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes. It is generally used to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. (TNI).

Laboratory Duplicate: aliquots of a sample taken from the same container under laboratory conditions and processed and analyzed independently.

Legal Chain of Custody Protocols: procedures employed to record the possession of samples from the time of sampling until analysis and are performed at the special request of the customer. These protocols include the use of a Chain of Custody Form that documents the collection, transport, and receipt of compliance samples by the laboratory. In addition, these protocols document all handling of the samples within the laboratory. (TNI)

Limit of Detection (LOD): A laboratory's estimate of the minimum amount of an analyte in a given matrix that an analytical process can reliably detect in their facility. (TNI)

Limit of Detection (Clarification): The smallest amount or concentration of a substance that must be present in a sample in order to be detected at a high level of confidence (99%). At the LOD, the false negative rate (Type II error) is 1%.

Limits of Quantitation (LOQ): The minimum levels, concentrations, or quantities of a target variable (e.g. target analyte) that can be reported with a specified degree of confidence. (TNI) For DOD projects, the LOQ shall be set at or above the concentration of the lowest initial calibration standard and within the calibration range.

Limit of Quantitation (Clarification): The lowest concentration that produces a quantitative result within specified limits of precision and bias.

Management: Those individuals directly responsible and accountable for planning, implementing, and assessing work. (ANSI/ASQ E4-2004)

Management System: System to establish policy and objectives and to achieve those objectives (ISO 9000).

Matrix: The substrate of a test sample. (TNI)

Matrix Spike (spiked sample, fortified sample): A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of Target analyte concentration is available. Matrix spikes are used, for example, to determine the effect of the matrix on a method's recovery efficiency. (TNI).

Matrix Spike Duplicate (spiked sample or fortified sample duplicate): a second replicate matrix spike prepared in the laboratory and analyzed to obtain a measure of the precision of the recovery for each analyte. (TNI).

Measurement System: A test method, as implemented at a particular laboratory, and which includes the equipment used to perform the test and the operator(s). (TNI)

Method: A body of procedures and techniques for performing an activity (e.g., sampling, chemical analysis, quantification), systematically presented in the order in which they are to be executed. (TNI)

Method Detection Limit: (now referred to as Detection Limit) one way to establish a Detection Limit, defined as the minimum concentration of a substance (an analyte) that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

Method Detection Limit (MDL) (Clarification): The MDL is one way to establish a Detection Limit, not a Limit of Detection.

Method of Standard Additions: A set of procedures adding one or more increments of a standard solution to sample aliquots of the same size in order to overcome inherent matrix effects. The procedures encompass the extrapolation back to obtain the sample concentration. (This process is often called spiking the sample.) (Modified Skoog, Holler, and Nieman. Principles of Instrumental Analysis. 1998)

Mobile Laboratory: A portable enclosed structure with necessary and appropriate accommodation and environmental conditions for a laboratory, within which testing is performed by analysts. Examples include but are not limited to trailers, vans and skid-mounted structures configured to house testing equipment and personnel. (TNI)

National Institute of Standards and Technology (NIST): A federal agency of the US Department of Commerce's Technology Administration that is designed as the United States national metrology institute. (NMI). (TNI)

National Environmental Laboratory Accreditation Program (NELAP): The overall National Environmental Laboratory Accreditation Program of which TNI is a part.

Negative Control: Measures taken to ensure that a test, its components, or the environment do not cause undesired effects, or produce incorrect test results.

Positive Control: Measures taken to ensure that a test and/or its components are working properly and producing correct or expected results from positive test subjects.

Precision: The degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves; a data quality indicator. Precision is usually expressed as standard deviation, variance or range, in either absolute or relative terms. (TNI).

Preservation: Any conditions under which a sample must be kept in order to maintain chemical and/or biological integrity prior to analysis. (TNI)

Procedure: A specified way to carry out an activity or a process. Procedures can be documented or not. (TNI)

Proficiency Testing: A means of evaluating a laboratory's performance under controlled conditions relative to a given set of criteria through analysis of unknown samples provided by an external source. (TNI)

Proficiency Testing Program: The aggregate of providing rigorously controlled and standardized environmental samples to a laboratory for analysis, reporting of results, statistical evaluation of the results and the collective demographics and results summary of all participating laboratories. (TNI)

Proficiency Test Sample (PT): A sample, the composition of which is unknown to the analyst and is provided to test whether the analyst/laboratory can produce analytical results within specified acceptance criteria. (TNI).

Protocol: A detailed written procedure for field and/or laboratory operation (e.g., sampling, analysis) which must be strictly followed. (TNI)

Quality Assurance: An integrated system of management activities involving planning, implementation, assessment, reporting and quality improvement to ensure that a process, item, or service is the type and quality needed and expected by the customer. (TNI)

Quality Assurance [Project] Plan (QAPP): A formal document describing the detailed quality control procedures by which the quality requirements defined for the data and decisions pertaining to a specific project are to be achieved. (EPA-QAD)

Quality Control: The overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that they meet the stated requirements established by the customer; operational techniques and activities that are used to fulfill requirements or quality; also the system of activities and checks used to ensure that measurement systems are maintained within prescribed limits, providing protection against "out of control" conditions and ensuring that the results are of acceptable quality. (TNI)

Quality Control Sample: A sample used to assess the performance of all or a portion of the measurement system. One of any number of samples, such as Certified Reference Materials, a quality system matrix fortified by spiking, or actual samples fortified by spiking intended to demonstrate that a measurement system or activity is in control. (TNI)

Quality Manual: A document stating the management policies, objectives, principles, organizational structure and authority, responsibilities, accountability, and implementation of an agency, organization, or laboratory, the ensure the quality of its product and the utility of its product to the users. (TNI)

Quality Manual Clarification: Alpha Analytical refers to Quality Manual as Corporate Quality Systems Manual (CQSM). (Alpha)

Quality System: A structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization for ensuring quality in its work processes, products (items), and services. The quality system provides the framework for planning, implementing, and assessing work performed by the organization and for carrying out required quality assurance (QA) and quality control (QC) activities. (TNI)

Quality System Matrix: These matrix definitions are to be used for purposes of batch and quality control requirements: (TNI)

Air and Emissions: Whole gas or vapor samples including those contained in flexible or rigid wall containers and the extracted concentrated analytes of interest from a gas or vapor that are collected with a sorbent tube, impinger solution, filter, or other device.

Aqueous: Any aqueous sample excluded from the definition of Drinking Water or Saline/Estuarine. Includes surface water, ground water effluents, and TCLP or other extracts.

Biological Tissue: Any sample of a biological origin such as fish tissue, shellfish, or plant material. Such samples shall be grouped according to origin.

Chemical Waste: A product or by-product of an industrial process that results in a matrix not previously defined.

Drinking Water: Any aqueous sample that has been designated a potable or potential potable water source.

Non-Aqueous Liquid: Any organic liquid with <15% settleable solids.

Saline/Estuarine: Any aqueous sample from an ocean or estuary, or other salt water source such as the Great Salt Lake.

Solids: Includes soils, sediments, sludges and other matrices with >15% settleable solids.

Raw Data: The documentation generated during sampling and analysis. This documentation includes, but is not limited to, field notes, electronic data, magnetic tapes, untabulated sample results, QC sample results, print outs of chromatograms, instrument outputs, and handwritten records. (TNI)

Reference Material: Material or substance one or more properties of which are sufficiently well established to be used for the calibration of an apparatus, the assessment of a measurement method, or for assigning values to materials. (TNI)

Reference Standard: Standard used for the calibration of working measurement standards in a given organization or at a given location. (TNI)

Representativeness: the degree to which the sample represents the properties of the particular sample being analyzed.

Resource Conservation and Recovery Act (RCRA): the enabling legislation under 42 USC 321 *et seq.* (1976), that gives EPA the authority to control hazardous waste from the "cradle-to-grave", including its generation, transportation, treatment, storage and disposal.

Safe Drinking Water Act (SDWA): the enabling legislation, 42 USC 300f *et seq.* (1974), (Public Law 93-523), that requires the EPA to protect the quality of drinking water in the U.S. by setting maximum allowable contaminant levels, monitoring, and enforcing violations.

Sample Tracking: procedures employed to record the possession of the samples from the time of sampling until analysis, reporting and archiving. These procedures include the use of a Chain of Custody Form that documents the collection, transport, and receipt of compliance samples to the laboratory. In addition, access to the laboratory is limited and controlled to protect the integrity of the samples.

Sampling: Activity related to obtaining a representative sample of the object of conformity assessment, according to a procedure. (TNI)**Second source calibration verification (ICV):** A standard obtained or prepared from a source independent of the source of standards for the initial calibration. Its concentration should be at or near the middle of the calibration range. It is done after the initial calibration.

Selectivity: The ability to analyze, distinguish, and determine a specific analyte or parameter from another component that may be a potential interferent. (TNI)

Sensitivity: The capability of a test method or instrument to discriminate between measurement responses representing different levels (e.g., concentrations) of a variable of interest. (TNI)

Signal to Noise Ratio: The signal carries information about the analyte, while noise is made up of extraneous information that is unwanted because it degrades the accuracy and precision of an analysis and also places a lower limit on the amount of analyte that can be detected. In most measurements, the average strength of the noise is constant and independent of the magnitude of the signal. Thus, the effect of noise on the relative error of a measurement becomes greater and greater as the quantity being measured (producing the signal) decreases in magnitude. (Skoog, Holler, and Nieman. Principles of Instrumental Analysis. 1998)

Signatures, Electronic: A technology that allows a person to electronically affix a signature or its equivalent to an electronic document. The electronic signature links the signature to the signer's identity and to the time the document was signed. Alpha approves the use of electronic signatures for signing and initializing any laboratory record including, by not limited to: analytical reports, controlled documents, workflows and purchasing requests.

Standard: The document describing the elements of laboratory accreditation that has been developed and established within the consensus principles of standard setting and meets the approval requirements of standard adoption organizations procedures and policies. (TNI)

Standard Operating Procedures (SOPs): A written document which details the method of an operation, analysis or action whose techniques and procedures are thoroughly prescribed and which is accepted as the method for performing certain routine or repetitive tasks. (TNI)

Standard Method: a test method issued by an organization generally recognized as competent to do so.

Standardized Reference Material (SRM): a certified reference material produced by the U.S. National Institute of Standards and Technology or other equivalent organization and characterized for absolute content, independent of analytical method.

Surrogate: a substance with properties that mimic the analyte of interest. It is unlikely to be found in environment samples and is added to them for quality control purposes.

Technology: a specific arrangement of analytical instruments, detection systems, and/or preparation techniques. (TNI)

Test: A technical operation that consists of the determination of one or more characteristics or performance of a given product, material, equipment, organism, physical phenomenon, process or service according to a specified procedure. The result of a test is normally recorded in a document sometimes called a test report or a test certificate. (ISO/IEC Guide 2 - 12.1, amended)

Tentatively Identified Compound (TIC): A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations. Tentatively Identified Compounds, if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported.

Test Method: An adoption of a scientific technique for performing a specific measurement, as documented in a laboratory SOP or as published by a recognized authority.

Toxic Substances Control Act (TSCA): the enabling legislation in 15 USC 2601 et seq. (1976), the provides for testing, regulating, and screening all chemicals produced or imported into the United States for possible toxic effects prior to commercial manufacture.

Traceability: The ability to trace the history, application, or location of an entity by means of recorded identifications. In a calibration sense, traceability relates measuring equipment to national or international standards, primary standards, basic physical constants or properties, or reference materials. In a data collection sense, it relates calculations and data generated throughout the project back to the requirements for the quality of the project. (TNI)

Tuning: A check and/or adjustment of instrument performance for mass spectrometry as required by the method.

United States Environmental Protection Agency (EPA): the federal governmental agency with responsibility for protecting public health and safeguarding and improving the natural environment (i.e. the air, water and land) upon which human life depends. (US-EPA)

Validation: the confirmation by examination and provision of objective evidence that the particular requirements for a specific intended use are fulfilled.

Verification: confirmation by examination and provision of evidence that specified requirements have been met. (TNI)

NOTE - In connection with the management of measuring equipment, verification provides a means for checking that the deviations between values indicated by a measuring instrument and corresponding known values of a measured quantity are consistently smaller than the maximum allowable error defined in a standard, regulation or specification peculiar to the management of the measuring equipment.

The result of verification leads to a decision either to restore in service, to perform adjustments, or to repair, or to downgrade, or to declare obsolete. In all cases, it is required that a written trace of the verification performed shall be kept on the measuring

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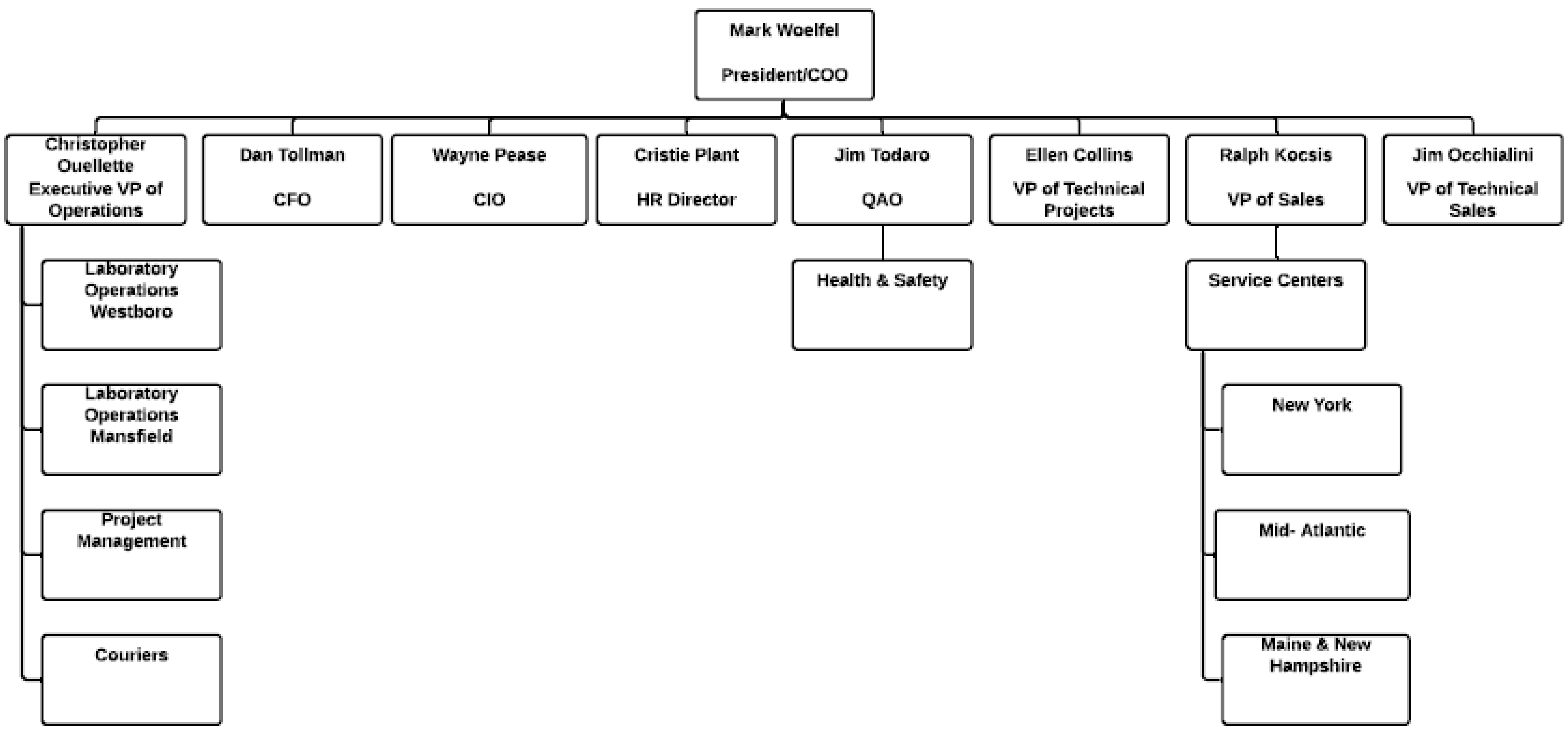
17 Appendix B – Organization Charts

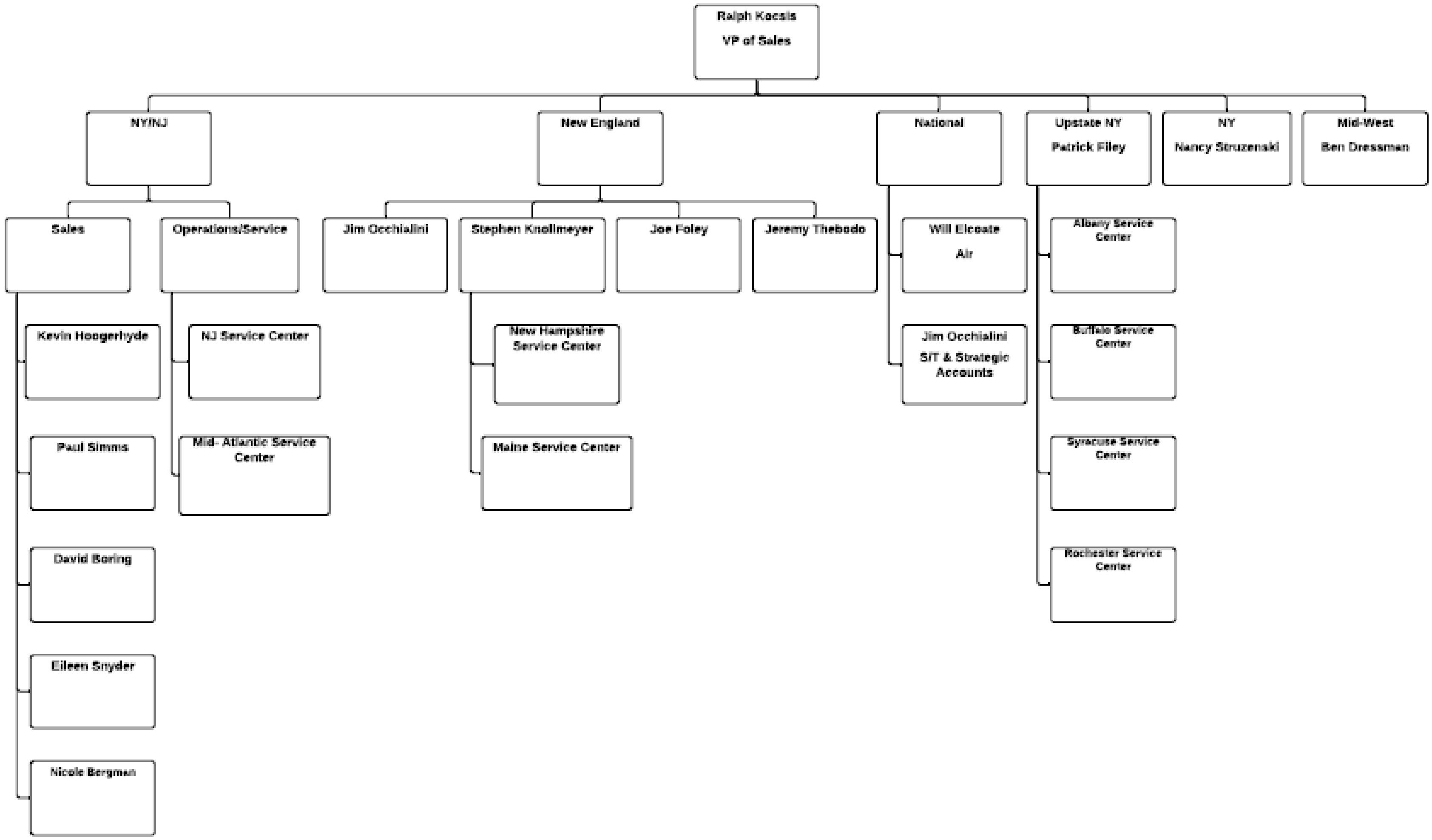
The following charts provide an overview of the organizational structure of Alpha Analytical. The chart also identifies the key personnel responsible for the listed positions. For the various laboratory areas, the individual departmental supervisors are noted. For a listing of all current key personnel, please refer to Section 18, Appendix C.

Updated 01/08/2020

Alpha Analytical
Company Organizational Chart

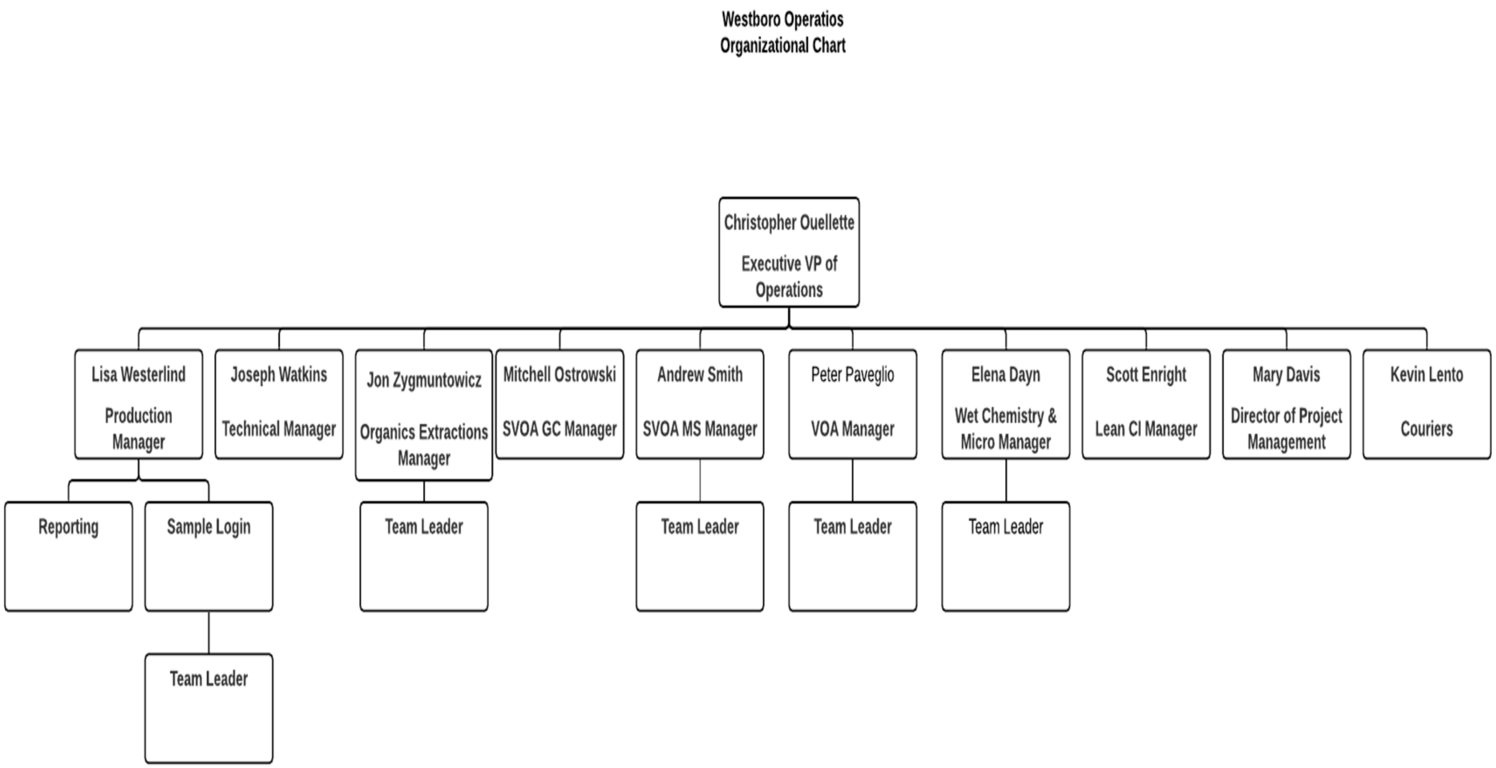


Updated 01/08/2020
Alpha Analytical
Sales Organizational Chart



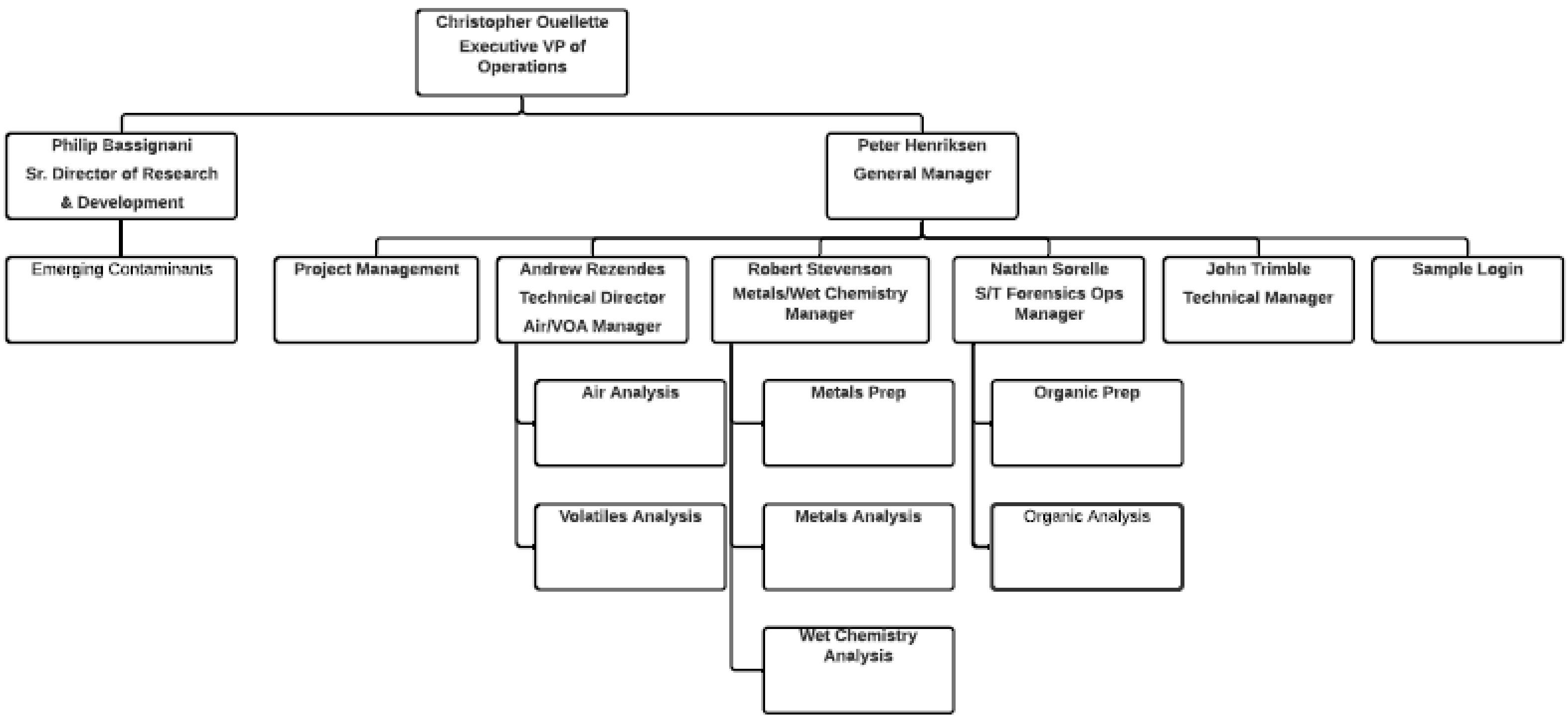
Updated 06/13/2019

Alpha Analytical
Westboro Facility Organizational Chart



Updated 01/09/2020

Alpha Analytical
Mansfield Facility Organizational Chart



18 Appendix C – List of Key Personnel

The following is a listing of all current key personnel. If role is specific to a facility it is denoted by either Westboro or Mansfield following the position title. **Updated 01/2019.**

President / COO: Mark Woelfel

Executive VP of Operations: Christopher Ouellette

CFO: Dan Tollman

CIO: Wayne Pease

Laboratory Technical Manager - Westboro: Joseph Watkins

Laboratory Technical Manager - Mansfield: John Trimble

Laboratory Technical Manager- Air, Volatiles Manager - Mansfield: Andy Rezendes

Quality Assurance Officer/Health & Safety Manager: James C. Todaro

Senior Director of Research & Development: Philip Bassignani

VP, Technical Projects: Ellen Collins

VP of Sales: Ralph Kocsis

VP, Technical Sales: James Occhialini, Pat Filey, Kevin Hoogerhyde, Steven Knollmeyer, Nancy Struzenski

Technical Sales Reps: Paul Simms, David Boring, Joe Foley, Jeremy Thebodo, Ben Dressman

General Manager, Mansfield: Peter Henriksen

Director of Project Management: Mary Davis

National Air Account Manager: Will Elcoate

Information Technology Manager: Glenn Fitzgibbons

Human Resources Director: Cristie Plant

Health & Safety Officer: Melissa White

Forensic & S/T Operations Manager, Mansfield: Nathan Sorelle

SVOA GC Manager, Westboro: Mitchell Ostrowski

SVOA GC/MS Manager, Westboro: Andrew Smith

Extractions Manager, Westboro: John Zygmuntowicz

VOA Department Manager, Westboro: Peter Paveglio

Wet Chemistry Department Manager, Westboro: Elena Dayn

Metals Department Manager, Mansfield: Robert Stevenson

Login Manager/ Reporting Manager, Westboro Lisa Westerlind

Quality Systems Specialists: Amy Rice, Rene Bennett, Jason Hebert, Michael Selling, Kirols Andrawis

Purchasing: David Peak

Logistics Manager: Kevin Lento

Equipment Technical Specialists: Patrick Sullivan, Szymon Sus, Kimberly Rivera

19 Appendix D – Preventive Maintenance Procedures

Optimized Service-Calibration Intervals		
Equipment	**Frequency**	**Type of Calibration or Maintenance**
Balances	semiannually daily	cleaning & operations check by service technician (external) calibration verification using Class S-1 certified weights
COD Reactor	annually	reaction temperature verification
Conductivity Bridge	annually annually each use	verification of cell constant complete operations check by service technician (external) calibration verification
DI Water System	as needed monthly annually daily	complete operations check by service technician (external) Residual Chlorine check Biosuitability testing (external) pH and Conductivity check
DO Meter	annually each use	complete operations check by service technician (external) calibration against air as specified by manufacturer
Emergency/Safety Equipment	annually monthly	fire extinguishers and emergency exit lighting check eye washes, showers, fire blanket and first aid kits checked
Freezers	daily	temperature verification
Gas Chromatographs	as needed as needed beginning and end of batch and 10 to 20 samples as per method	injection port preparation; cleaning of detectors initial multi-point calibration continuing calibration verification (CCV) against initial calibration
ICP	Every other day Daily Annually Annually As needed	Change pump tubing Calibration, profile Complete operations check by service technician (external), Linear Dynamic Range determination Clean torch, clean nebulizer, clean spray chamber
Lachat analyzer	Daily As needed	Calibration, clean lines Change tubing, change O-rings
Mass Spectrometers (GC & ICP)	bi-annually as needed 12 hour or daily	change of mechanical pump oil by service technician (external) cleaning of source BFB, DFTPP or ICP-MS tune analysis followed by ICAL or CCV
Mercury Analyzer	monthly each use	clean cell and change pump windings calibration using multi-point curve
Auto-pipettes	Quarterly Daily	verification of accuracy and precision verification of precision for DOD method auto-pipettes
Microwave	Quarterly Annually	power and temperature verification RPM verification
Ovens	Annually	temperature verification
pH Meters	Annually each use	complete operations check by service technician (external) calibration using certified buffers
Refrigerators (General Use)	daily	temperature verification
Refrigerators (Sample Management)	daily	temperature verification
Spectrophotometer	Semi-annually Semi-annually daily	cleaning & operations check by service technician (external) wavelength verification (external) continuing calibration verification (CCV) against initial calibration
TCLP/ZHE Rotator	Quarterly	RPM verification
Thermometers (Mercury/Alcohol) Thermometers (Bimetal/mechanical)	Annually Quarterly	calibration against NIST traceable thermometer (internal) calibration against NIST traceable thermometer (internal)
Thermometers (digital/IR)	Quarterly	calibration against NIST traceable thermometer (external)
Thermometer (NIST Traceable)	Annually	calibration and certification of conformance (external)
Turbidity meter	Annually each use	cleaning & operations check by service technician (external) calibration using formazin
Weights (Class S-1)	Annually Triennially	Working weights verified against reference weights Reference weights calibrated for conformance (external)

20 Appendix E – Alpha Code of Ethics Agreement

Alpha Analytical, Inc.
Ethical Conduct and Data Integrity Agreement

A. ***Personal Pledge:*** I understand that I am charged with meeting the highest degree of ethical standards in performing all of my duties and responsibilities and pledge to only report data, test results and conclusions that are accurate, precise and of the highest quality.

B. ***Protocol Pledges:*** I agree to adhere to the following protocols and principles of ethical conduct in fulfilling my work assignments at Alpha:

1. All work assigned to me will be performed using Standard Operating Procedures (SOPs) that are based on EPA approved methods or Alpha methods.

2. I will only report results or data that match the actual results observed or measured.

3. I will not intentionally nor improperly manipulate or falsify data in any manner, including both sample and QC data. Furthermore, I will not modify data values unless the modification can be technically justified through a measurable analytical process or method acceptable to Alpha. All such modifications will be clearly and thoroughly documented in the appropriate laboratory notebooks and raw data and include my initials or signature and date.

4. I will not intentionally report dates and times of analyses that are not the actual dates and times the analyses were conducted.

5. I will not intentionally represent another individual's work as my own or represent my work as someone else's.

6. I will not make false statements to, or seek to otherwise deceive Alpha staff, leaders or customers. I will not, through acts of commission, omission, erasure or destruction, improperly report measurements, standards results, data, test results or conclusions.

C. ***Guardian Pledge:***

1. I will not condone any accidental or intentional reporting of unauthentic data by other Alpha staff and will immediately report such occurrences to my supervisor, the QA Officer, the Laboratory Technical Manager or corporate leadership. I understand that failure to report such occurrences may subject me to immediate discipline, including termination.

2. If a supervisor or other member of the Alpha leadership group requests me to engage in, or perform an activity that I feel is compromising data validity or quality, I have the right to not comply with the request and appeal this action through Alpha's QA Officer, senior leadership or corporate officers, including the President of the company.

3. I understand that, if my job includes supervisory responsibilities, then I will not instruct, request or direct any subordinate to perform any laboratory practice that is unethical or

improper. Also, I will not discourage, intimidate or inhibit a staff member who may choose to appropriately appeal my supervisory instruction, request or directive that may be perceived to be improper, nor retaliate against those who do so.

D. ***Agreement Signature:*** I have read and fully understand all provisions of the *Alpha Analytical Ethical Conduct and Data Integrity Agreement*. I further realize and acknowledge my responsibility as an Alpha staff member to follow these standards. I clearly understand that adherence to these standards is a requirement of continued employment at Alpha.

____
Employee Signature

____
Printed Name

____
Date

Review Requirements
The *Ethical Conduct and Data Integrity Agreement* must be signed at the time of hire (or within 2 weeks of a staff member's receipt of this policy). Such signature is a condition of continued employment at Alpha. Failure to comply with these requirements will result in immediate discharge from Alpha employment. This agreement is not an employment contract and does not modify in any manner the company's *Employment-at-Will* Agreement.

21 Appendix F– Floor Plan Westboro Facility

22 Appendix G– Floor Plan Mansfield Facility

23 Appendix H – Job Titles and Requirements

TITLE*	REQUIRED EDUCATION**	MINIMUM REQUIRED ENVIRONMENTAL LAB EXPERIENCE	MINIMUM REQUIRED SKILLS***
Technical Manager (Director) Organic Laboratory	BS or BA in Chemical, Environmental, or Biological Science; including minimum 24 credit hours in Chemistry. Masters or Doctoral degree in one of above disciplines may be substituted for 1 year of experience.	Two (2) years with the analysis of organic analytes in an environmental laboratory	1. Advanced technical knowledge of all analytical methods performed by the lab 2. Advanced technical instrumentation/lab systems knowledge 3. Knowledge of safe laboratory practices, OSHA regs and emergency protocols 4. Experience with and understanding of LIMS 5. Experience with method development and implementation 6. Experience monitoring standards of performance in Quality Control and Quality Assurance
Technical Manager (Director) Inorganic Laboratory	BS or BA in Chemical, Environmental, or Biological Science; including minimum 16 credit hours in Chemistry. Masters or Doctoral degree in one of above disciplines may be substituted for 1 year of experience.	Two (2) years with the analysis of inorganic analytes in an environmental laboratory	1. Advanced technical knowledge of all analytical methods performed by the lab 2. Advanced technical instrumentation/lab systems knowledge 3. Knowledge of safe laboratory practices, OSHA regs and emergency protocols 4. Experience with and understanding of LIMS 5. Experience with method development and implementation 6. Experience monitoring standards of performance in Quality Control and Quality Assurance
Technical Manager (Director) Microbiology Laboratory	BS or BA in Chemical, Environmental, or Biological Science; including minimum 16 credit hours in the Biological Sciences, including at least one course having microbiology as a major component. Masters or Doctoral degree in one of above disciplines may be substituted for 1 year of experience.	Two (2) years with the analysis of microbiological analytes in an environmental laboratory	1. Advanced technical knowledge of all analytical methods performed by the lab 2. Advanced technical instrumentation/lab systems knowledge 3. Knowledge of safe laboratory practices, OSHA regs and emergency protocols 4. Experience with and understanding of LIMS 5. Experience with method development and implementation 6. Experience monitoring standards of performance in Quality Control and Quality Assurance
Quality Assurance Officer	BS/BA in Chemistry, Biology, Environmental or related Science	Two (2) years Environmental Laboratory Experience	1. Advanced technical knowledge of all analytical methods performed by the lab 2. Knowledgeable in Federal, State Programs (THE NELAC INSTITUTE (TNI) STANDARDS, etc.) 3. Able to develop QA/QC policies and certification requirements 4. Able to develop training programs for quality procedures 5. Documented training and/or experience in QA and QA procedures 6. Knowledge of safe laboratory practices and emergency protocols

TITLE*	REQUIRED EDUCATION**	MINIMUM REQUIRED ENVIRONMENTAL LAB EXPERIENCE	MINIMUM REQUIRED SKILLS***
Laboratory Coordinator	High School Diploma; Associates or BS/BA in Chemistry, Biology or Environmental or related Science preferred	1 year +	1. Knowledge of safe laboratory practices and emergency protocols 2. Proficient in all methods and SOP's within their department 3. Experience with and understanding of LIMS 4. Proven ability to meet TAT (turnaround times)
Quality Systems Specialist	BS/BA Chemistry, Biology, Environmental or related Science	2 years +	1. General knowledge of laboratory methods 2. Experience with and understanding of LIMS 3. Strong attention to detail 4. Strong oral/written communication and organizational skills 5. Knowledge of QA/QC policies and certification requirements
EH&S Coordinator	High School or Equivalent	2 years +	1. General knowledge of lab operations 2. Detailed knowledge of safe lab practices and emergency protocols 3. Hazardous Waste Management and RCRA Regulation Training 4. DOT Hazardous Materials Regulations Training 5. OSHA Compliance Training 6. Able to develop and deliver new hire and ongoing safety training programs
Lab Technician I	HS or Equivalent	0-1 years. 1+ years preferred.	1. Knowledge of safe laboratory practices 2. Able to follow direction and Standard Operating Procedures (SOP's) 3. Familiarity with standard and reagent preparation 4. Knowledgeable in using volumetric pipettes and glassware 5. Strong oral/written communication and organizational skills
Lab Technician II	HS or Equivalent	2-4 years	1. All skills of Lab Technician I 2. Trained in majority of technician skills relative to department
Lab Technician III	HS or Equivalent	5 years +	1. All skills of Lab Technician II 2. Experienced in training staff
Lab Technician/Chemist I	BS/BA in Chemistry, Biology, Environmental or related Science	0-1 years	1. Knowledge of safe laboratory practices 2. Able to follow direction and Standard Operating Procedures (SOP's) 3. Familiarity with standard and reagent preparation 4. Knowledgeable in using volumetric pipettes and glassware 5. Strong oral/written communication and organizational skills
Lab Technician/Chemist II	BS/BA in Chemistry, Biology, Environmental or related Science	2-4 years	1. All skills of Chemist I 2. Trained in majority of department methods

TITLE*	REQUIRED EDUCATION**	MINIMUM REQUIRED ENVIRONMENTAL LAB EXPERIENCE	MINIMUM REQUIRED SKILLS***
Lab Technician/Chemist III	BS/BA in Chemistry, Biology, Environmental or related Science	5 years +	1. All skills of Chemist II 2. Experienced in training staff
Analyst I	HS or Equivalent	0-1 years	1. Knowledge of safe laboratory practices 2. Able to follow direction and Standard Operating Procedures (SOP's) 3. Experienced with sample handling, preparation and/or extraction
Analyst II	HS or Equivalent	2-4 years	1. All skills of Analyst I 2. Experienced in machine operation, maintenance and troubleshooting
Analyst III	HS or Equivalent	5 years +	1. All skills of Analyst II 2. Experienced in data review and reporting 3. Experienced in training staff
Analytical Chemist I	BS/BA in Chemistry, Biology, Environmental or related Science	6 mos-1 year	1. Knowledge of safe laboratory practices 2. Able to follow direction and Standard Operating Procedures (SOP's) 3. Experienced with sample handling, preparation and/or extraction
Analytical Chemist II	BS/BA in Chemistry, Biology, Environmental or related Science	2-4 years	1. All skills of Analytical Chemist I 2. Experienced in machine operation, maintenance and troubleshooting
Analytical Chemist III	BS/BA in Chemistry, Biology, or Environmental or related Science	5 years +	1. All skills of Analytical Chemist II 2. Experienced in data review and reporting 3. Experienced in training staff
Data Deliverable Specialist I	HS Diploma, BS/BA or Associates preferred	0-1 years	1. Introductory knowledge of laboratory methods 2.Able to follow direction and Standard Operating Procedures (SOP's) 3. Working knowledge of Adobe Acrobat, Microsoft Word, Excel 4. Good writing and typing skills
Data Deliverable Specialist II	HS Diploma, BS/BA or Associates preferred	2-4 years	1. All skills of Data Deliverable Specialist I 2. General knowledge of laboratory methods 3. Understanding of data review/ data reporting process 4. Experience with and understanding of LIMS and electronic data deliverables

TITLE*	REQUIRED EDUCATION**	MINIMUM REQUIRED ENVIRONMENTAL LAB EXPERIENCE	MINIMUM REQUIRED SKILLS***
Data Deliverable Specialist III	HS Diploma, BS/BA or Associates preferred	5 years +	1. All skills of Data Deliverable Specialist II 2. Intermediate/advanced knowledge of laboratory methods 3. Able to perform report review 4. Experience with and understanding of LIMS and electronic data deliverables 5. Able to initiate re-work where necessary
Laboratory Intern	2 Semesters of Chemistry, Biology or Environmental Science	None; Lab work study experience preferred	1. Knowledge of safe laboratory practices 2. Able to follow direction and Standard Operating Procedures

KEY

* Internal terms only. Full title would have "Environmental Laboratory" and specific department preceding it.

** Substitutions: Equivalent knowledge may be substituted for a degree in some instances.

*** Not meant to be an exhaustive list of skill requirements. For full list of skills consult the "Laboratory Skills" list. Actual Job Duties and Responsibilities can be found within job descriptions for each position.

24 Appendix I – Standard Operating Procedures

WESTBORO SOP #	Title
1728	Waste Management and Disposal
1730	Balance Calibration Check
1733	Thermometer Calibration
1737	Inorganics Glassware Cleaning and Handling
1738	Water Quality Monitoring
1745	Reagent, Solvent and Standard Control
1948	Separatory Funnel Liquid-Liquid Extraction – EPA 3510C
1953	Organic Extraction Glassware Cleaning & Handling
1954	Soxhlet Extraction – EPA 3540C
1955	Sulfur Cleanup – EPA 3660A
1956	Oil and Waste Dilution – EPA 3580A
1959	Microwave Extraction – EPA 3546
1960	Sulfuric Acid Cleanup – EPA 3665A
1962	Florisil Cleanup
1963	Fractionation Cleanup
1964	Preparation of Samples for Chlorinated Herbicides
2107	Volatile Organic Compounds – EPA 524.2
2108	Volatile Organic Compounds – EPA 8260C
2109	Polynuclear Aromatic Hydrocarbons (PAHs) by SIM – EPA 8270D (modified)
2111	Semivolatile Organics by GC/MS – EPA 8270D
2112	TCLP/SPLP Extraction - Volatile Organics SW-846 Method 1311/1312
2113	EDB, DBCP & TCP in Water by Microextraction & Gas Chromatography – EPA 504.1, 8011
2116	Organochlorine Pesticides by Capillary Column GC – EPA 8081B
2119	Extractable Petroleum Hydrocarbons – MADEP
2120	Volatile Petroleum Hydrocarbons – MADEP
2123	Polychlorinated Biphenyls in Oil – EPA 600/4-81-045
2125	TPH-Diesel Range Organics, Maine 4.1.25, EPA 8015C (Modified)
2126	TPH- Gasoline Range Organics, Maine 4.2.17, EPA 8015C (Modified)
2127	CT-ETPH
2128	Herbicides by 8151A
2129	PCBs by Capillary Column Gas Chromatography - EPA 8082A
2131	New Jersey EPH Method
2133	TCLP Extraction Metals and Semi-Volatile Organics – SW-846 Method 1311
2135	SPLP Extraction Inorganics and Semivolatile Organics, EPA 1312

WESTBORO SOP #	Title
2161	Fecal Coliform by Membrane Filtration – SM 9222D
2163	Fecal Coliform by Multiple Tube Fermentation – SM 9221E
2191	Heterotrophic Plate Count – SM 9215B
2192	Total Coliform/E.Coli – Presence/Absence (Colilert) – SM 9223B
2193	Total Coliform by Membrane Filtration – SM 9222B
2194	Total Coliform by Multiple Tube Fermentation – SM 9221B
2195	Chlorophyll A – SM 10200H
2196	E. Coli – Membrane Filtration
2197	Chlorophyll A – EPA 446
2198	Air Density Monitoring
2199	Inhibitory Residue Test
2200	Enterococcus – MF
2201	Total Coliform, E.Coli & Enterococcus by Quantification Methods (Quanti Tray)
2202	pH, Liquid Samples
2203	pH, Soil & Waste Samples
2204	Hexavalent Chromium
2205	Biological Oxygen Demand
2206	Ammonia Nitrogen
2207	Total Kjeldahl Nitrogen
2208	Chemical Oxygen Demand
2209	Oil & Grease by n-Hexane Extraction Method & Gravimetry
2210	Cyanide, Total
2211	Phenol, Total
2212	Sulfate, Turbidimetric Method
2213	Alkalinity, Titration Method –SM 2320B
2214	Determination of Inorganic Anions by Ion Chromatography – EPA 300.0
2215	Total Organic Carbon/Dissolved Organic Carbon
2216	Chloride – SM 4500Cl-E, EPA 9251
2217	Nitrate, Nitrite and Nitrate/Nitrite Nitrogen – EPA 353.2, SM 4500NO_3-F
2218	Total Solids (Dried @ 103-105^o) and TVS – SM 2540B, SM 2540E
2219	Total Dissolved Solids – SM 2540C
2220	Total Suspended Solids – SM 2540D
2221	Total Sulfide – SM 4500S2-AD, EPA 9030B
2222	MBAS, Anionic Surfactants – SM 5540C
2223	Fluoride, Electrode Method – SM 4500F-BC
2224	Turbidity, Nephelometric Method – EPA 180.1, SM 2130B
2225	Orthophosphate, Colorimetric Single Reagent Method – SM 4500P-E
2226	Total Phosphorous, Colorimetric Combined Reagent Method – SM 4500P-E
2227	Flashpoint – EPA 1010

WESTBORO SOP #	Title
2228	Reactivity – EPA Chapter 7.3
2229	Total Solids (Dried @ 103-105°) – SM 2540G
2230	Specific Conductance and Salinity
2231	True and Apparent Color, Visual Comparison Method
2232	Acidity, Titration Method
2233	Determination of Formaldehyde by HPLC, EPA 8315A
2234	Sulfite, Iodometric
2235	Ferrous Iron
2236	Residual Chlorine
2237	ORP
2238	Ignitability of Solids EPA 1030
2239	Physiologically Available Cyanide (PAC)
2240	Total Settleable Solids SM 2540 F
2241	Fixed and Volatile Solids in Solid and Semisolid Samples – SM 2540G
2242	Tannin & Lignin
2243	Nitrite - Manual Colorimetric Method
2244	Paint Filter Liquids Test
2245	Odor, Threshold Odor Test
2249	Dissolved Oxygen
2251	Perchlorate by IC/MS/MS
3743	Free Cyanide
9177	Total Phenol - SEAL Method
9733	Oil & Grease and TPH in Soil
10807	Percent Organic Matter in Soil
12838	Buchi Concentration
14751	Determination of UV-Absorbing Organic Constituents at 254nm
17972	Extractable Organic Halides (EOX)
18236	Chloropicrin and Carbon Tetrachloride by EPA 8011
19332	DI Water Extraction ASTM D3987
21994	Nonfractionated EPH
23148	Gilson EPH Fractionation
23561	Volatile Petroleum Hydrocarbons (VPH) by GC/MS
25691	Semivolatile Organic Compounds by GC/MS EPA 625.1
25693	Volatile Organic Compounds by EPA 624.1
26801	TPH - Gasoline Range Organics Maine 4.2.17, EPA 8015D
27634	True and Apparent Color, Single Wavelength Method
28200	PCBs by EPA 608.3
28201	Pesticides by EPA 608.3

MANSFIELD SOP #	Title
1753	Glassware Cleaning
1754	Balance Calibration
1755	Pipette Checks
1797	Haz Waste
1816	Reagent Solvent Standard Control
2134	Hot Block Digestion for Aqueous Samples EPA 3005A
2138	Mercury Aqueous 7470A
2139	Mercury Soil 7471B
2140	AVS SEM
2141	Hydride Generation
2142	Mercury Aqueous 1631E
2143	Mercury Soil 7474
2148	Metals Soil Digestion 3050
2150	Metals Microwave 3015
2152	Seawater Extraction of Metals
2155	EPA 8270D
2157	PAH by SIM
2158	EPA 8081B
2160	EPA 8082A Aroclors/Congeners by GC and TO-10A
2162	Pesticides/PCB Aroclors/Congeners by GC/MS SIM
2164	1,4-Dioxane GC/MS SIM
2165	Separatory Funnel Extraction EPA 3510C
2166	Tissue Prep
2167	GPC
2168	Sulfur Cleanup 3660
2169	Sulfuric Acid Cleanup 3665
2170	Silica Gel Cleanup
2171	% Lipids
2172	Microscale Solvent Extraction EPA 3570
2173	Soxhlet Extraction EPA 3540C
2174	Soxhlet Extraction of PUFs
2175	% Total Solids
2182	TOC by Lloyd Kahn
2183	Particle Size Determination
2184	Particulates in Air PM-10
2186	EPA TO-15
2187	APH
2188	Air PIANO
2189	Dissolved Gases

MANSFIELD SOP #	Title
2190	Cleaning & Preparation of Air Sampling Equipment
2246	TPH and SHC
2247	Alkylated PAH
2248	Organic Lead
2252	Fixed Gases
2255	PIANO Volatiles
2256	Ethanol in Oil
2257	Whole Oil Analysis
2259	Density Determination of Oils
2260	Alumina Cleanup
2261	Shaker Table
2263	Gravimetric Determination
2264	Tissue Extraction
2265	Organic Waste Dilution
2267	Client SOP: SGC - Manual Method
2268	Client SOP: DCM Extractable Method
4246	PAHs by SPME
6438	Mercury in Sorbent Tubes by CVAA
7900	Mercury 1631E Using Cetac-M-8000 Analyzer
9077	Porewater Generation
9480	EPA-TO-12
12863	EPA 8270D GC/MS Full Scan TO-13A
13091	HPAH
13406	Particulate Organic Carbon
14500	Lead in Particulate Matter
17452	TOC by EPA 9060A
17456	Moisture, Ash and Organic Matter
17829	Specific Gravity of Soil
17830	Liquid Limit, Plastic Limit and Plasticity Index of Soils
17940	1,4-Dioxane in Drinking Water by EPA 522
18086	Total Suspended Solids (TSS) SM 2540D
18705	PCB Congeners by GC/MS-SIM EPA 8270D
18710	Trace Elements in Waters and Wastes by ICP-MS EPA 200.8
18711	Metals by ICP EPA 200.7
18715	Mercury in Water (CVAA) EPA 245.1
18716	Hot Block Digestion for Aqueous Samples EPA 3005A
18717	Microwave Assisted Acid Digestion of TCLP Extracts EPA 3015
18718	Microwave Assisted Acid Digestion for Metals EPA 3015A/3051A
18817	Alcohols by FID- Aqueous Direct Injection EPA 8015D

MANSFIELD SOP #	Title
19625	Glycols by GC-FID EPA 8015D
19971	Air Drying Samples for PCBs and Metals Analysis
19978	Density of Soil
22132	Data Review – Ohio VAP
23511	PFAS by LC/MS/MS by EPA 537
23528	PFAS by LC/MS/MS Isotope Dilution by EPA 537(M)
24426	Preparation of EPA 537 by SPE for Analysis via LC/MS/MS
24454	Acetonitrile Extraction for Unknown Compounds via GCFID
25896	EPA 8290A Dioxins and Furans by Hi-Res MS
25900	EPA 1613B Dioxins and Furans by Hi-Res MS
25923	Mercury in Liquid Waste (Automated Cold-Vapor Technique) EPA 7470A
25924	Mercury in Solid/Semisolid Waste (Manual Cold-Vapor Technique) EPA 7471B
26026	PCB Congeners by GC/ECD 8082A
26796	Metals by ICP EPA 6010D
26797	Metals by ICP-MS EPA 6020B
27322	In Vitro Accessibility Assay for Lead in Soil EPA 1340
27360	PFAS in Cranberry Matrix by EPA 537 (M) LC/MS/MS Isotope Dilution
27485	Total Petroleum Hydrocarbons Screen by GC/FID 8015D
27897	PCB Congeners by High Resolution GC/MS
29033	PFAS by LC/MS/MS in Non-Potable Water
27056	HiRes Laboratory Glassware Cleaning
29139	Biomimetic Extraction Using SPME
32082	MADEP PFAS by SPE & LC/MS/MS Isotope

CORPORATE SOP #	Title
1559	Sample Receipt and Login
1560	Sample Custody and Tracking
1561	Bottle Order Preparation
1562	Computer System Backup/Control
1563	Computer and Network Security
1564	Software Validation and Control
1565	Training Program
1566	Report Generation and Approval
1567	Organics Data Deliverable Package Review
1722	Customer Inquiry and Complaint Procedures
1723	Project Management
1724	Quote/Contract Procedure
1725	Project Communication Form Generation

CORPORATE SOP #	Title
1726	Purchasing Procedure
1727	Accounts Payable Invoice Processing
1729	Document Control
1731	Manual Integration and Compound Rejection
1732	DL LOD LOQ Generation
1734	Control Limit Generation
1735	Analytical Guidelines for Method Validation
1736	Corrective and Preventative Actions
1739	Demonstration of Capability (DOC) Generation
1740	Internal Audit Procedure
1741	Data Review – Organics
1742	Calculating Measurement Uncertainty
1743	Annual Management Review
1744	Sample Compositing Procedure
1746	Nonconformance Planning/Procedures
1747	Temperature Datalogger Operation
2274	Data Validation Package
17553	Lab Supply Transfer Procedure
18821	Weights Verification
18909	PT Corrective and Preventive Action Process

25 Appendix J– Report Signing - List of Authorized Personnel

All final reports are reviewed and signed by authorized personnel, who have been designated to perform such review.

The following is the listing of all authorized representatives of the company who have been authorized by the Laboratory Technical Manager to perform final report review.

Name	Title
Peter Henriksen	General Manager
Susan O'Neil	Project Manager
Christopher Anderson	Project Manager
Elizabeth Porta	Project Manager
Andrew Rezendes	Volatiles Manager and Air Technical Manager
Lisa S. Westerlind	Technical Representative
Ellen M. Collins	Technical Representative
Michelle M. Morris	Technical Representative
Kelly Stenstrom	Technical Representative
Cristin Walker	Technical Representative
Cynthia McQueen	Technical Representative
Melissa Sturgis	Technical Representative
Amita Naik	Technical Representative
Caitlin Walukevich	Technical Representative
Tiffani Morrissey	Technical Representative
Jennifer Clements	Technical Representative
Kelly O'Neill	Technical Representative
Alycia Mogayzel	Technical Representative
James C. Todaro	Quality Assurance Officer